ELECTRIC RAILWAY JOURNAL

Report of the
Atlantic City Convention of the
American Electric Railway Association
and Affiliated Associations
October 6-10, 1919

Report of the Hearings of the
Federal Electric Railways Commission
at Washington, D. C.
September 29 to October 4, 1919

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ELECTRIC RAILWAY JOURNAL
CONVENTION DAILY

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AS THE REGULAR issues of the ELECTRIC RAILWAY JOURNAL are not appearing, owing to printing conditions in New York, we have enlarged this issue of the Convention Daily to give the report of the Atlantic City Convention and the final hearings of the Federal Electric Railways Commission at Washington. When we are able to resume printing in New York, we shall begin with the issue of Oct. 4 and will follow that with other issues which have not appeared. We believe that the proceedings of the Atlantic City Convention and the study of the electric railway situation which is being made by the Federal Commission at Washington are the most important events of electric railway interest during the year. Hence, we need not apologize to our readers for devoting all the space in this number to these two vital topics.

Lessons of the Convention

THAT a brighter day is dawning for the industry seemed to be the happy thought of the thousands of delegates who left Atlantic City last week at the close of the thirty-eighth annual convention of the association. A note of optimism was in the air, and despite the dangers which still threaten the railway utilities, the change in public attitude toward transportation agencies now apparent appeared to have given a hopeful impetus to the men on whose shoulders the burden has been carried during several critical years. From Hedges to Harries this call for closer co-operation and courage was sounded in the various meetings.

While the general registration was somewhat below that of the 1916 gathering, the attendance at the sessions of the American Association as well as of the affiliated associations was larger and more enthusiastic. As expected, interest in fare problems predominated. The members let it be known that the thorough threshing out of the electric railway problems in Washington had begun to show results in their own localities. Leaders of the industry who gave their time and effort to work on the Committee of One Hundred must have felt compensated in the general acknowledgment that their endeavors had borne fruit. Another notable feature of this convention was the active participation of manufacturers in several association meetings—particularly in the discussion of safety car and fare-collection problems. Co-operation of this sort will continue and be productive of helpful suggestions. Action taken last week allies the manufacturers with the A. E. R. A. on a permanent basis, and the industry will be better able to cope with its problems because of this solidified organization.

General Harries referred to the contest between the irresistible and the immovable—the irresistible increase in operating expenses and the immovable rates of fare. Those who were fortunate enough to take part in this convention must feel that while operating costs may not decrease for years to come, the fare situation is improving. The public has been aroused to a consciousness of the truth. The electric railways will be saved. These thoughts have strengthened the morale of railway leaders. With a new sense of courage the forces of fair play must prevail.

The Outcome of the Washington Hearings

THE Washington hearings have been concluded. The all-absorbing question is now as to the outcome. A vast amount of testimony has been presented and certainly the commission has heard about every possible conception of the situation, even some so unsound as to be ridiculous. But there has been full and free recitation of facts and opinions from eminent authorities, and based on these, whatever the commission may recommend as an unbiased national tribunal free from all local prejudices and petty politics, cannot but make a profound impression upon the public in general. It seems to have been so thoroughly established that the difficulties of the railways are very real and are the result of causes largely beyond their control, that the commission's report must surely endeavor to set the public right on this and on the essential character of the industry. And we believe the work of the commission will have a great influence for rational and fair dealing.

Perhaps this probable phase of the report, serving to clarify the public mind and tone down its antagonistic attitude, will be the greatest accomplishment of the commission's sincere endeavor. The commission is without direct power and can only give shape and the force of its eminence to broad recommended principles for the guidance of local communities in working out their own specific problems. So, with the report of the Federal Commission made public, attention will again revert to individual companies.

It seems to us after having heard the full hearings, that the settlement of the individual railway problems will in general rather naturally follow two consequences. Those companies which can restore their credit under a reasonable service-at-cost franchise providing an automatically flexible fare and at present a slightly higher fare and income, will go on as private corporations. Those companies which are unable to restore their credit will be forced to the use of the credit of the state or municipality, which sooner or later means some form of public ownership.

That there will be considerable tendency toward the latter solution seems inevitable, for the public in some communities is so antagonistic that it would do anything rather than help the company continue in control. But the way is surely being paved for better conditions of operation under either the one plan or the other, and, broadly speaking, the end of the black clouds can be seen in the distant sky, from under which our essential industry must emerge and be restored to a sound basis. There will be more receiverships, but undoubtedly the anxiously awaited report of the commission will be the beginning of a better era.

Wage Scales Must Be on Reasonable Basis

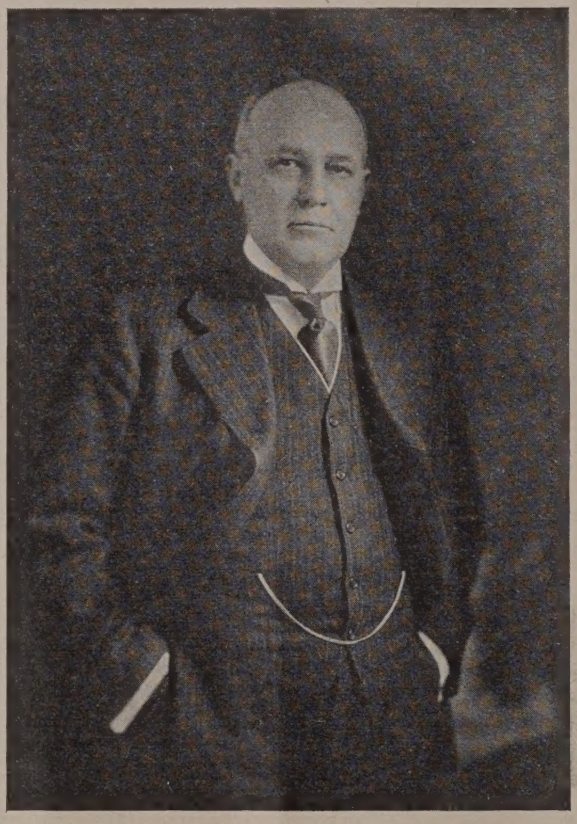
In an Address Before the American Electric Railway Association Atlantic City Convention President J. H. Pardee Outlined Principles Which Need Consideration in Wage Adjustments—He Paid a Tribute to the Work of the Association's "Committee of One Hundred" and to the Loyalty of the Manufacturers in the Membership

THE thirty-eighth annual convention of the American Electric Railway Association was held at Atlantic City, N. J., on Oct. 6-10. The first session was called to order at the Greek Temple about 10 o'clock on Oct. 7 by President J. H. Pardee, who presented the annual address of the president. Among other things President Pardee said:

The past two years have been fraught with events of great moment to the world. The changes set in motion by the war have had a marked effect upon our political, social and industrial life, and upon no industry has this effect been more pronounced than upon that in which we are all engaged, so that even the continuance of the service which we are rendering is in doubt.

The question as to the continued life of the electric railway industry is in the first instance a question of cost, whether the price of the product which we are producing can be brought into such relation to its cost as will enable us to furnish the service which the needs of the public require and to attract into our business the capital necessary for the rendition of this service.

It is evident that the predominant factor in this is the cost of labor, and that the entire problem of so-called "low fares" is largely a problem of increasing the efficiency of labor as well as management and of adjusting wages upon a scale commensurate with the service that is performed. The return that capital shall receive does not primarily enter into the proposition at all. Today this return has practically ceased, with the result that the credit of these utilities is so impaired that the money needed for extensions and improvements and the introduction of economical devices, all working to the reduction of the cost of service, is no longer forthcoming. Investment in public utility enterprise is not and cannot be controlled by the government. Those who possess savings, which are capital, are free agents as to the disposition of those savings, and they will invest them only in those enterprises where a fair return is in prospect and where the safety of investment is assured. In consequence, these increased costs must be borne either by the users of the service, through an increase of fares, by a reduction in the cost of operation, or by the taxpayers through subsidies, or by all three. As a practical matter, however, under present governmental supervision, it is the public that pays, either through increased fares or decreased service, so that the question of wages is a matter between the wage earner and the passenger.



J. H. PARDEE

Excessive wages are a tax upon the fares, inefficient labor is similarly a tax and the adjustment of wages is a matter which vitally concerns those who use street railway service.

In this adjustment the public is represented by the management of the electric railways. The efforts of these managements towards maintaining a reasonable wage level is exercised for the public, and the railways thus become the agents of the public in the disputes that arise in consequence of labor's demands.

DETERMINATION OF WAGE SCALES

In the negotiations which are constantly going on between labor and these public utilities, the utilities have, through a combination of circumstances, been barred from bidding in the open market for the labor necessary to operate the properties. When the national administration set up the National War Labor Board as a body arbitrarily to fix the recompense for labor, it but accelerated the development of a method which was even before this time establishing itself in industry. The war has ended and the activities of the War Labor Board have ceased, but the method of fixing wages through arbitration and by the award of some tribunal has been so firmly planted that unless conditions vastly change, it is this method that will be pursued for a number of years to come. As practical men we must accept, for the time being at least, the system which has thus come into being, and our efforts should be directed towards perfecting this machinery so that substantial justice may follow, not only for the wage worker, but for the public, which pays the wages and the representatives of which we are.

It is evident to me that in some way and somehow standards must be created by which wage scales may be formulated and the amount and character of service rendered for these wage scales be definitely determined. In the present crisis which confronts us, efficiency of labor as well as management is essential to a proper solution of the electric railway problem. The public has a right to demand from the management, and from labor under the management, the highest degree of efficiency obtainable. It is as true in our business as it is true in any other branch of human activity that the prices of the product and the price paid for creating the product depends upon the amount of production, and that we cannot continue to decrease production and increase wages unless the price obtained for the

product is vastly increased, which in the last analysis means that the rewards for this service shall come, if they shall come at all, from the labor and efficiency in other branches of industry.

Collective bargaining is the basis of the method of wage adjustment under which we are now working, and collective bargaining argues a monopoly. The law of supply and demand is abrogated and the law of competition as a regulator of prices is set aside. Regulated monopolies are in many instances desirable. The business of local transportation, for instance, should, in the interest of the entire people, be a regulated monopoly, but an unregulated monopoly is abhorent alike to economic law and to the system of government under which we in the United States are living. Arbitration between one responsible party and one irresponsible party has never and can never be productive of permanent good or for long serve to settle disputed questions. If labor is to enter into an agreement as to its wages, then labor must assume responsibility for the carrying out of the agreements. If labor is to be allowed the privileges of collective bargaining for its services, then the agencies through which their collective bargaining is done must be endowed with some corporate personality which can be held to account for the maintenance of its agreements and the carrying out of the awards made by the tribunals to which it submits its claims for adjudication. If the privilege of collective bargaining be granted to labor by the public, steps must be taken to prevent that privilege from being converted into a bludgeon with which to coerce the public into compliance with extortionate demands. Strikes upon regulated public utilities are not directed against capital to secure a fair share of the profits of the industry—they are in fact directed against the public. They are, when proper means of arbitration are provided, a crime against the public and should be so treated.

These are the facts of a situation that is too little realized by the people of this country, who have been educated to the idea that the question of wages is a question as between capital and those who work with their hands and have lost sight of the fact that they as individuals and as a class are directly interested in the great problem. In the case of the public utilities, already regulated and already, through the operation of laws or because of economic reasons, cut down to the lowest possible return that will secure the capital needed for their continuance, the issue is particularly clear-cut. It cannot be too forcibly brought to the attention of the public that such increases in street railway fares as have occurred in this country are due not to the demand of capital for increased return or for the continuance of the return already being received but to the necessity of providing revenues to meet the increased demands—and I am not here arguing as to the justice of these demands—of the wage earners on the various properties.

HEARINGS OF FEDERAL COMMISSION

Before this condition or any of the conditions which are now causing the collapse of the local transportation utilities of this country can be corrected, the education of the people of the United States to the true state that exists is absolutely essential. An immense step forward in this process of education has been accomplished through the deliberations of the Federal Electric Railways Commission, appointed by the President of the United States. I shall not refer in detail as to what has thus been accomplished. The report of the Committee of One Hundred to be presented to you later in the session will explain what the commission has done. Its report has not yet been made, and we do not know what remedies it will suggest for the solution of the questions submitted to it for investigation. We do know, however, that it has succeeded in awakening the public to the realization of the fact that the electric railway problem is national, in that its causes are national; that it intimately affects the interests of each individual, and that unless it can be satisfactorily solved the entire economic structure of the country will be disturbed, and that a readjustment of relations between these utilities and the public is essential, not only to owners and investors in the properties, but to the communities that are served.

We know, moreover, that a direct solution of the problems through the federal commission or through the national government is impossible and that the process inaugurated by the Washington hearings, to become effective must eventually be localized, so that the facts elicited will be brought home to each local situation. I am convinced that the association would be remiss in its duties to its members and to the industry as a whole and the public, if it ceased its efforts with the termination of the life of the Federal Electric Railways Commission and did not further extend this process of education which we all recognize as distinctly beneficial.

I believe that the most helpful thing in connection with the deliberations at Washington was the fact that there was a fair and impartial tribunal before which all interests could appear and could give voice to their ideas and present the facts of the situation as they saw them, and it is indeed remarkable that among so many diverse interests there should be such unanimity of expression as to the fundamental principles involved.

PUBLIC EDUCATION REGARDING FACTS URGED

My suggestion to this association is that it should endeavor to extend as far as possible, and by methods akin to those that have been used, this process of public education, that it should not only lend its assistance, but should take active and vigorous steps in securing the creation of public forums in various sections of the country before which the same issues may be presented more and more localized, and before which there would be the same freedom of discussion as has given to the federal hearings their greatest value. The great mass of valuable information, the enormously useful concensus of opinion which the federal investigation has brought out should not be allowed to become buried in the formal archives of the commission. It should be put into use. The principles enunciated have already received a national application and should be given, next, a sectional and then a local application, in ways which I think will readily suggest themselves to those who give the matter thought and consideration. It is for this reason that I recommend to you the continuance of the Committee of One Hundred until such time, as, in the opinion of the committee itself, its usefulness is at an end.

I cannot too highly commend the great work which the Committee of One Hundred has accomplished. Its organization was, in the first place, and the success of its efforts was, in the second place, only possible because in the American Electric Railway Association the industry had an organization equipped to safeguard its interests and take constructive action in its behalf. The present usefulness has never been more thoroughly demonstrated. At the midyear meeting of the association I asked for co-operation of both the member companies and the individual members in carrying out the work which was before us. A splendid response was the result.

RELATIONS WITH MANUFACTURERS

In connection with this matter of co-operation, I desire on behalf of the railway members of the association to publicly express their thanks to the manufacturer members for the magnificent way in which they have supported the activities of the organization. The records show that practically the same group of manufacturers have been behind the organization in all of its numerous enterprises

in behalf of the industry. By their membership, by their contributions and support of the War Board, the Committee of One Hundred, and by their participation in the splendid exhibit which forms so important a part of this convention, they have demonstrated their loyalty. It is incumbent upon us to acknowledge the spirit of co-operation which has brought into closer touch the operating and the manufacturers' interests centered in the industry. It is a propitious augury for the future usefulness of the American Electric Railway Association.

It was through this co-operation alone that we have been enabled to do what we have done. A continuance and an extension of this co-operation is essential at the present time. In the main, we all face the same difficulties and the same problems. It has been shown to us what we can do when we act together. It has been proved beyond the possibility of a doubt that the association, of which we are members, can be of vast assistance, not only in connection with the greater matters of policy, but with the more intimate details of the operation of the properties intrusted to our care.

Other Activities of Association

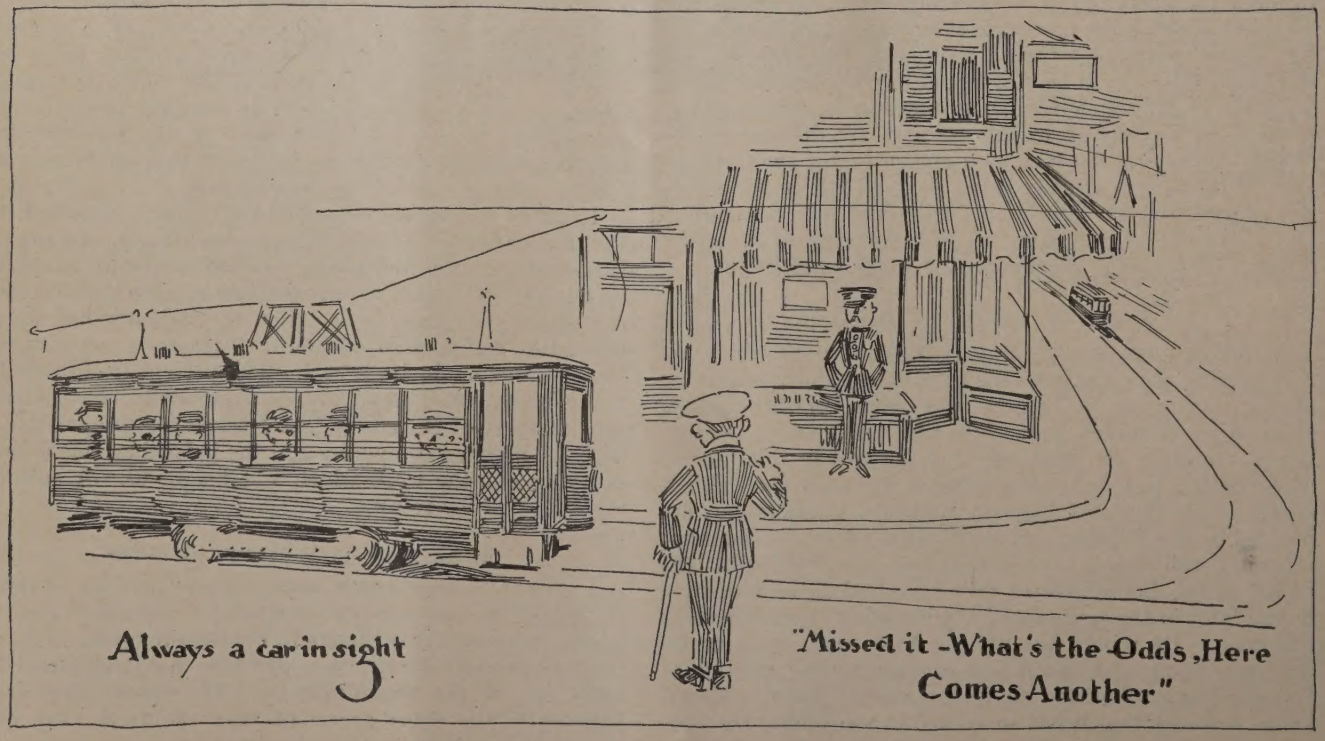
You will later hear of the work that has been accomplished in connection with the subject of railway mail pay and of the interest that has been shown in connection with federal legislation. The thorough presentation of the case of the electric railways in both of these instances has been made possible because in the association, the industry had an organization equipped to act in its interests and act promptly.

The "collection and dissemination of information" was one of the objects for which the organization was created. During the past year the service performed by the association in connection with this matter has been widely extended and it is still being extended. A special engineer, whose qualifications for the task are beyond dispute, has been appointed to take charge of this service, and as a result, the work has been more than doubled. I do not propose to burden you with details, but I cannot refrain from calling attention to the fact that more than 1000 inquiries concerning all the details of electric railway operation have been promptly and completely answered through the office of the secretary. The value of this service to all electric railway operators cannot be easily over-estimated. The many letters of appreciation received from executives to whom this information has been furnished indicate a realization of its value. The association has become, as was intended by its organizers, a clearing house of information. There are great possibilities in the extension and perfection of this branch of the association's activities. In many other ways and in many other respects the association can be of increased service to its members.

The extension of the present activities and the addition of new activities means that your organization must be strengthened both financially and in the matter of membership. The dues now being paid are lower than those in any other national association of the kind. They require readjustment, and I recommend that there be appointed at this session of the convention a committee of five, who shall consider the question of dues and shall report its findings at Thursday's meeting.

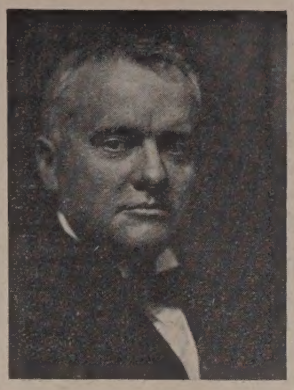
I desire, at this time, to make acknowledgment to Secretary Burritt and his efficient staff for the work which he and they have performed for the association and for the industry during the year. To Mr. Burritt's untiring energy and his executive ability is due the fact that we have been able to accomplish the very many things that have been accomplished during the past year. I feel that, personally, I owe him a debt of gratitude—a debt which is shared by all member companies and by those electric railway companies which are not members of the association.

Gentlemen, I am an optimist as to the future. I believe that the clouds are clearing away, and that by wise, intelligent and constructive action, through the machinery of this great association, we can hasten the day when the essential industry which we represent shall be re-established upon a basis which will enable us to perform the functions for which it was created and will assure those who, through local transportation companies, loaned their savings to the public service, a reasonable and an assured return.



Men with the Nerve to Tell the People the Facts Are Needed*

BY JOB E. HEDGES
Receiver New York Railways



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Whatever Happens Wrongly in This Country Is a Matter of Default—The American Public Will Act Fairly if It Is Informed as to the Facts; It Should Have the Opportunity of Drawing Its Own Conclusions from the Same Major and Minor Facts as Are in Possession of the Utilities—The Situation in New York City and Some of the Causes Leading Up to It, Are Discussed

TO BE entirely consistent I must disclaim any technical knowledge of this industry except what has been gathered by some five or six months of a rather tempestuous career, during which I have been threatened with indictment, a strike, lack of fares and almost everything you can think of. But be that as it may, I am like the president of your association, an optimist, and I have to make a few reflections, and you will pardon me if they are offered gratuitously. But I am still of the belief that however many points gathered together may be useful to the world the ten commandments still have validity.

I was in a gathering yesterday of the street railway interests in New York City called together by the Public Service Commissioner, in which a suggestion was made that there should be a congregation of minds and thought and some solution offered which might bring order out of chaos in the street railway situation in New York City. In the midst of that hearing a letter was read from the comptroller of the city, which I mention merely by way of illustration, in which, speaking for the administrative board of the city, he alleged that there could be no solution of any kind in which the city participated unless the Federal Court reversed itself on all the positions it has so far taken, and that those who sought higher fares should have orders to restore conditions to the situation in which they were, and the city should be made a party in the receivership.

I see by the morning papers that proceedings for contempt of court, based on that statement, have been instituted. That is not a part of my thought, except to show the suggestion and illustration. And I want to point out that the president of your association is responsible if my remarks are not entirely technical, because he gave me that thought in one of his suggestions, and the thought I have in mind in this connection is that we must go on with this question of publicity until the Committee of One Hundred, indeed, shall have done its work. Permit me to say, that the Committee of One Hundred should never be discharged, and I will give you my reasons, which are the only excuse I have to offer for my being on my feet.

DIFFERENCE BETWEEN THEORY AND PRACTICE IN GOVERNMENT

It is very easy for men in the intricacies of competition and in the diversified industries of this country to forget general principles and to substitute personalities for ideas, and one of the words I want to interject at once into this discussion is the word "politics," and I want to interject it in its broadest sense, its most wholesome sense, and in the sense of its being a governmental necessity.

The difference between the theory and practice of our form of government is antipodal. This country is founded on the proposition that every man is ready, able and willing to vote "yes" or "no" on any topic. That would be so, were it true. The fact that he is not—the fact that most of them never can be and that many of them do not want to be has nothing to do with the theory, but it has much to do with the activities of men who are able to, and must, bear the burdens of the general average.

There is no topic in this country from the street railways to any other topic, in its final essence, which is not a political topic, and I want to make myself very clear that I am not talking of anything that bears on partisanship, because I am a very ardent partisan.

There are only two relations—and I am not trying to be academic—in this country that are unaffected by the casting of the ballot. One is the matter of worship, and the other is the privacy of the home. There is no other human relation which is unaffected, directly or indirectly, by the casting of the ballot. There are few questions which arise in this country that can be considered economic questions of themselves; academically, yes; theoretically, yes; but to be put in operation they must follow the casting of a ballot that places somebody in a position to speak officially on something that affects the community at large and affects every possible ingredient of it.

Whatever happens wrongly in this country is a matter of default. It happens because somebody did not do something to prevent somebody doing something that he did and when it is all over we pass resolutions, repledge ourselves to the nation, condemn somebody, disperse and go home and as a rule tell the family that we made the motion in the meeting.

NEW YORK CITY SITUATION

And that simple child-like process has been going on for years, until the other day on the east side in New York City, in explaining the matter of the increase of fares, owing to the withdrawal of certain lines there that were not paying, I made the statement that I could not see why I had any right to operate those lines. I could not in the simplicity of my thought understand what right I had to use capital for operating expenses. And having decided that I suggested the matter to the court, and the court said: "Your position is sound and you will not be directed to operate those lines." Therefore the honest proposition was not to do it—that was perfectly simple.

I met an assistant district attorney of the city of New York and he commented on the order directing me to withdraw the service on those lines and he suggested that the time had now come for the withdrawal and recall of judges by the rope, the same as was done in the time of Charles the Second. His history was a little inaccurate, as well as his ideas. He subsequently made that statement in an open meeting. That statement attracted a total of about three columns in the New York press. In other words, a sworn

* Abstract of address presented at meeting of American Electric Railway Association, Atlantic City, N. J., Oct. 7, 1919.

officer of the law sought to inculcate the doctrine of physical force in this country, and his utterance attracted just about that degree of attention.

Now, I cannot see any reason in the world why any topic of any kind affecting any industry should not be discussed in the open always. I attended a meeting yesterday in which it was suggested that we talk behind closed doors. It did not make any difference to me where we talked or what was said, provided it was said. The most terrible thing to face today is fact.

Now, here is a great industry which exists all over the United States affecting everybody. The troubles affecting this industry are widespread. They go to securities, they go to domestic and civic comfort, they go to the question of rents, they go to the question of orderly conduct, and this problem is just getting before the public mind.

I heard a judge over in New York, at this meeting I referred to on the East Side, a Municipal Court judge, make the statement that he had visited all the main cities of the United States (he made this statement with a left-hand gesture), and while rates are being lowered in many of these cities and the companies are making money at a 5-cent fare, he said that he did not see why the rates of fare should be increased in New York City. Somebody asked me why we should ask for more than 5 cents in New York, while they were getting transportation for 3 cents in Cleveland. Out of my simplicity and inexperience I said I could not see any reason why they should, except they were not getting it for 3 cents in Cleveland. Another man said: "Should a railroad company violate its contract when it has agreed to carry passengers for 5 cents?" I said, "No, absolutely they should not." Then the question was: "Why are they doing it?" I said: "They are not doing it." Then the query came: "Well, what is the trouble?" And I replied, "They just are not able to do it, but the contract remains just the same." Then, one of the gentlemen said: "Mr. Hedges, if a man makes a contract to manufacture a certain number of suits of clothes for a certain price and then the price of material and labor rises, should he continue to furnish the clothes at the same rate he contracted to furnish them?" I said, "Sure, there is no question about it, but suppose he does not have the cash? What do people over on the East Side do in this clothing business? You just call a little meeting of creditors."

Then they understood it. Then I told them that as the man has some material on hand, and as somebody wants the clothes and as the creditors do not want to sell the material at less than it cost, they form a committee of creditors and let the man continue in the business.

Then I said: "You make 6 per cent over here, don't you?" and there was an audible smile over the room, and I said, "Then you just let the man go ahead and manufacture the material he has on hand, give him a little relief, and he manufactures and sells the clothing, and after that they decide whether they will let him continue in business, and they all have an interest in it."

Responsibilities of Capital

Now, I do not know much about capital, never having had much. I had never been in such close proximity to the "interests" as I have been since I have been a receiver. I have never before been so near Wall Street and men of large sums of money, and I have very little respect for the courage of men of substantial means and substantial business. I am a great believer in the synchronizing of the brain and spine. Most of these men seem to devote their energies to securing these large sums of money and letting the republic go on as it will. They usually try to get enough money to take care of their progeny, and let the public take care of itself.

I am not worried about the man who commits violence. I am not worried about the man who sets fire to a house, or tries to. He will be taken care of by reason of the righteous indignation of the people, but what this country needs most is some plain substantial people of nerve who dare to tell the facts and have confidence in the people and understand them and can talk in a language that people can understand. This technical business is all right for "us" technical people, but it does not get anywhere except with the technical people. We are a minority, and the majority cast the votes, and you cannot get by the vote proposition, either.

A lady called at my office the other day a little confused. She said she understood I was the receiver of the New York Railways Company. She said that she held some stock in the Interborough and was a good Democrat. Naturally, I use the word "good" advisedly. She was a lady and an enrolled Democrat in the organization and had fought her way on the general committee. She heard a candidate for the Assembly in her party utter certain remarks, and she came down to tell me about them and gave me a written record of them. The statement was as follows:

> "Mr. ————————, in his speech, said that Hylan and the administration intended to wreck the street railways of this city and take them over for us, then raise the fares, and that the revenues so received would come into our own pockets"—it was not certain whether he meant the public or not—"and then see the patronage we would have to give you all."

Now, in order that there shall not be the slightest touch of partisanship in my remarks I want to state that the County Committee in New York representing the distinguished party of which I am a humble member in its resolution declared that the street railways of New York could carry passengers at 5 cents and make money. It did not happen to know anything about it. It had made no investigation about it, and the man who wrote the resolution could not understand it if he had made an investigation, and it was a cheap way to get cheap votes, from cheap people, for a dishonest proposition.

It is not necessary to argue economic propositions when these things are going on.

Reasons for Present Unrest

Why is there the unrest in this country which exists? Let us talk like home folks for a moment. The reason is that after 143 odd years we have not Americanized this country. It is no better off, so far as the American spirit goes, than it was fifty years ago. We must have people from the other side—they are desirable, but the whole thing has been allowed to go by default, until what we suffer from is intelligent men who are morally inactive, and who are competing with men mentally active without morals, and the great quorum is the uninformed general public which is not given the facts.

When men can go abroad in this country and talk about a unity of title and a right without an obligation, the country is in danger, and we know as a matter of fact that the form of government set up in Russia was conceived in New York City by a man who went up and down in the East Side and preached that doctrine and was allowed to do so without molestation because it was no one's judgment to stop it. Under such circumstances we need not be disturbed in our own minds because the general public is disturbed.

Railways Will Be Forced to Stop

This association is interested in an increase in the rates of fares on electric railways. Where is all of what I said pertinent to that problem? There is not a person who can ride for 5 cents who would not like to ride for 4 cents for the rest of his life. No one is going to be unduly active in giving up any extra money for fares, yet it is the general consensus of opinion from men who know that the railways in New York City cannot continue to operate at the present rate of

fare—it cannot be done. It cannot be done, and that being the case, what is going to happen?

I only know what is going to happen in my situation. When my cash balance gets to a point, which it will in about ninety days, where I cannot maintain the reserve I should maintain and continue solvent business operations, I am going to ask the court to stop the running of the cars, because it would be dishonest to run them under those circumstances, and I refuse to be a crook for popularity. I believe the American citizen on the average is on the level, and I want to state, with great seriousness, that the problem in this country is the problem of getting the facts on any single situation into the minds of all the people so they can draw their conclusions from the same major and minor premises, and then the problem is solved.

HUMAN ASSOCIATION A MATTER OF CONTRACT

This question of human association is a matter of contract, not of choice. It is not one of expediency and business efficiency, it is a matter of contract. Let me illustrate without being too academic. Every once in a while we refer to the Constitution of the United States when we cannot think of anything else to talk about, usually about election time, and abandon it after that. We say we are the greatest people in the world. So we are, when we are operating. That constitution has three very simple and childlike and fundamental things in it that we have all learned by heart and pay no attention to. They are the right to life, liberty and the pursuit of happiness.

That is just as simple as daylight, but I want to lay down the proposition as a matter of philosophy and government of law that there is no such thing in this nation under the constitution as a right without an obligation, and the demonstration is simple. If I have the right to life, liberty and pursuit of happiness you have it also, I cannot have it alone. If I have it it is your obligation to recognize it, because you admit the proposition. If you have it it is my obligation to recognize it, because otherwise I have no right to it. You see, it is perfectly simple. Therefore, we are never going to settle the question of labor and capital by any formula that was ever organized by man in Washington or elsewhere until every human being recognizes and admits as a part of his active open life that his first obligation, after that to the God that made him, is to the government under which he lives, and when he recognizes that, the rest of it follows as a matter of course, because it is a human compromise within limitations fixed by law.

That is one of the lessons I want to bring here, because I believe in it profoundly.

HOW A STRIKE WAS FACED

When I saw an announcement that the men were going to move for a strike on my lines shortly—that is the Court's lines—I did not know what to do, so I thought it out quietly according to general principles, leaving out the fact that I am a receiver of the railways. So I wrote a little cordial note to the men on the lines, and told them man-to-man like, that there were only two things I could see involved in the situation. One was whether a human being could work for another human being at a rate he agreed to work for, and the other was whether property was inviolate, and I intimated that as the law furnished people to substantiate these things, if anybody failed in his duty I would ask to have him removed from public office. It struck me that these were simple propositions, and I used the only instrument of law furnished me, the only method by virtue of which I could protect people who had a right to look to me for protection.

I then sent that letter, and a day or two after my letter was sent to the District Attorney charging me with conspiracy to force a man to do something that the law said he ought to do, and up to the present writing I have not been honored with an indictment on that proposition. Now, that is not uttered by way of jest, by way of referring to any individual, but by way of saying, through an illustration what I want to say, and that is I believe the American people are sound at the core if you go to them man to man and talk to them in a language they can understand.

What is the use of talking about economics? What is the use of discussing whether you have a 5 or 6-cent rate of fare, or any cars? We must get back to fundamentals, and these fundamentals are the responsibilities that all men must assume, the capable men and the less capable men, in the solution of these problems, and they must be approached with an honesty of purpose and fairness of mind.

Now, that is one lesson I have to bring here. I do not know much about it. I do not know much about a good many other things connected with the business, like electrolysis, and I do not care much about it. If you cannot get a man to put in the ballot box a ballot that is to elect somebody to a position of responsibility who will be mentally, morally and intellectually on the level, it does not make any difference about these reports. They are temporary relief to the superheated, solicitous mind.

You may not have heard of it, but I once ran for Governor, and the fact I am here proves I was not elected. The man who beat me was impeached—it was not my fault—but I went through a campaign without making a misstatement of fact or making a compromise I could not carry out, and when men will trade applause for untruth and will seduce the uninformed, you do not need to talk about Bolshevism in this country. The intellectual Bolshevists are the men in this country who are the troublesome element—the men of outward and visibly interior decency, whose actual contribution to the decency of life could be summed up in a regret.

THE FARE QUESTION MUST BE SOLVED

We have all got to get down to business, whether we want to or not. This fare question is going to be solved, of course, sometime, after a lot of money has been lost and after a lot of people have been impoverished who were not responsible for any of the conditions. The main argument I have heard in New York against an increase in fare is that somewhere, sometime, somebody took some money from some one who did not have title to it. That happened some years ago. As I recall things through reading about them there may be something in it. I do not know, but you do not have to give up religion because you catch a minister taking a drink. I do not understand that the divine ordinance of matrimony has to be abandoned because Eve made an error of judgment on a moonlight night in the Garden of Eden.

But I cannot get up any sympathy, and it is perfectly apparent I am not a candidate for office this time, because if I ever do run again I shall run on the platform of telling the truth, and I have not any sympathy for a man with a lot of money who howls because somebody else is doing something somebody else can understand.

We have just got through the war. I remember years ago that in our campaigns we discussed a question of having an army and a navy. The people said: "No, we cannot do that, that would breed militarism." That was not the reason—that was the conversation. The reason was that we would not pay the taxes, and we saved a few hundreds of millions of dollars at the expense of a half score of billions of dollars and 250,000 odd dead and maimed soldiers. This is the greatest post-mortem country in the world.

Then we used to talk about our merchant marine. The reply to that was, "no," and the no was pretty universally expressed. The reason given was that that would mean fostering industries at the expense of the government, paternalism. That was not the reason. The reason was we

could not figure out the advantage per capita, and therefore we did not do it. And for that reason it was necessary for us to hire the vessels of other nations to help us carry our soldiers over there to prevent their coming over here.

The gentleman who received the medal this morning had a topic for his paper which is very profound, and profounder than many of us appreciate, "do your bit." And the one thought I want to leave here is this: While we are talking about efficiency and electrolysis and a lot of things like that, which are all right, do not let us forget that these are academic things of no value unless they are applied to something that somebody understands.

People Must Be Educated

Now, the American government is being functioned largely today by people who think differently from what we do, do not know our institutions or are indifferent to them, and we are surprised when we get in the midst of a great topic like the question of rates of fares for the purpose of continuing a great industry, when there is not an immediate response on the part of those in public life to assist in the problem. It is an economic principle, politically administered, that is what it is—the question of fares always will be, and if they should be raised tomorrow in the city of New York, 6 or 7 or 8 cents, to meet the requirements of the return on investment, the return to stockholders and the payment of interest on bonds, the discussion of the merits of it must be kept up or it will be undermined.

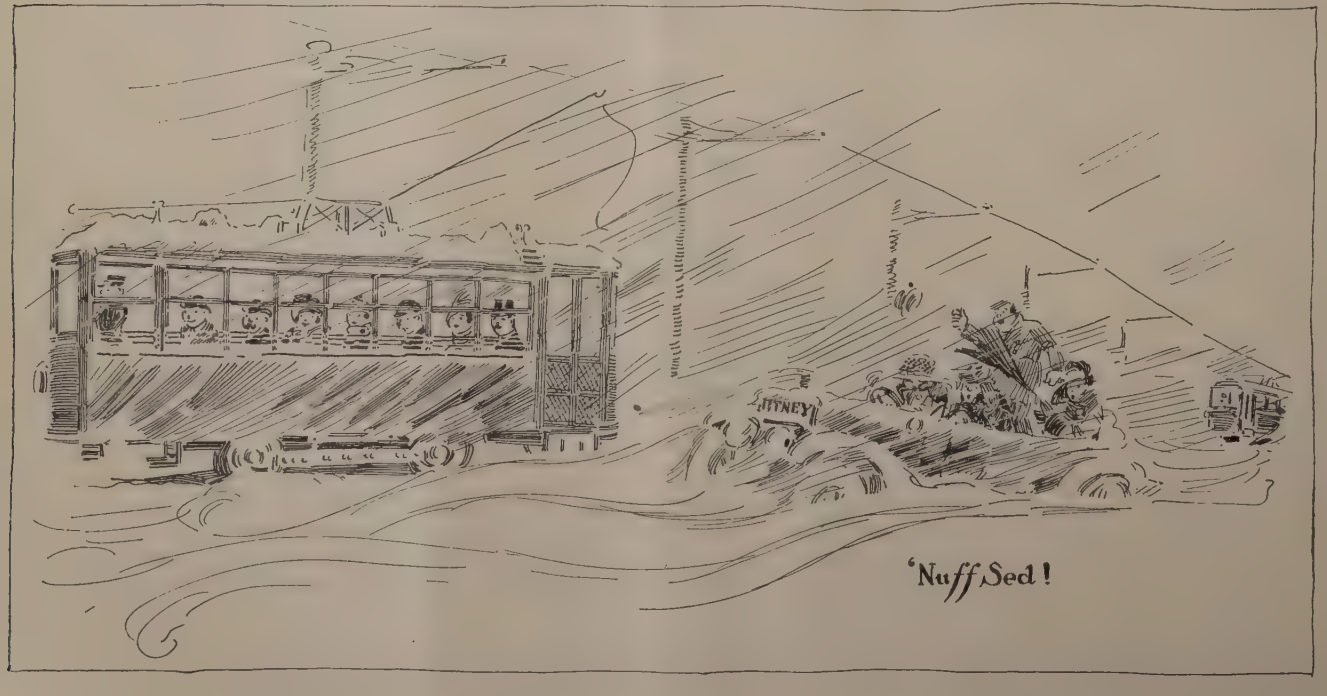
The penalty of doing business in the United States of America is paid in the price of educating the public to proper realization of the problems involved in that business, and a man who fears to do it, lest it will cause a little row, the man who is timid about it, who fears that his bonds will fall off three-eighths of 1 per cent or possibly 20 per cent, or he may lose a stockholder, who may disagree with him, does not appeal to me. I may be wrong in that, but if men of substance have not the nerve to get back of these problems and make them understood and appreciated by the less intelligent part of the community, and the people who are less endowed with this world's goods, the problem will be the same.

The greatest thing in the United States today is to be the chairman of the executive committee of an uplift society. It is becoming a profession. Some one has to do it. I do not think that the man of limited means is disturbed because another man has a large amount of money—I think what disturbs the man with little money is the vulgar display of wealth surreptitiously gained. Every man owes it to every other man, as a civic proposition, so to conduct himself and his business and human affairs that he will not disturb the civic contractual relations between citizens predicated in the constitution.

The man of mental substance or social substance, real or alleged, who is afraid to argue the proposition out before the general public as against the alert, active, aggressive man without principles is no better off than that man, when you consider the thing from the standpoint of usefulness to the community.

Every Right Carries an Obligation

In closing I want to say a word, and I say it without any pride of opinion. I have too much intelligence not to know that in five or six months a man cannot pick up information or acquire knowledge of things and events that justify him in talking to other people of wider experience in giving advice. But I do know that beneath all business, beneath every combination in this country, beneath every association as a part of the antagonisms or what not, is a very great fundamental proposition centered in this thought—that in this country there is no such thing in law, or constitution or judicial interpretation as a right without an obligation. And that obligation demands as a matter of civic uprightness that men with intelligence and responsibility shall go to the great body of people, who are just as well intentioned in the first instance, but with a less advantageous opportunity of securing information, and telling them man to man what it all means, and they will respond. Then these difficulties, which will always exist more or less, while human people are alive, will be smoothed out, and then we will not have to settle so many things academically. It is a good deal better to have something you own, and not be nervous when a stranger taps you on the shoulder, than it is to have a lot more and have it taken away from you.



Relationship of Items of Cost Under Pre-War Conditions and Today*

The Effect of Higher Costs of Labor and Materials on Operation Are Analyzed and Illustrated by an Example—Movement Charges Have Increased More Rapidly than Terminal Charges—Effect of Minimum Wage and Higher Pay for Overtime on Rush-Hour Cost

BY F. W. DOOLITTLE
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THE fact of high prices is one that does not need to be dwelt upon for emphasis today. With exceptions so few as to be negligible, prices today are so much higher than those existing in 1914 that all industry has found it necessary to rearrange the budget of revenues and expenditures in order to continue in existence. Probably no single fact of recent history has been discussed so fully, and with all so ineffectually, as the high cost of living. These high costs are both a cause and an effect. High prices for food and clothing, for rents and service, bring about increased wages, and these increased wages in turn make the cost of food and clothing and all other commodities into which wages enter, higher than before.

The electric railway industry has been before the public with a schedule of increased costs of labor and materials, continuously during the past three years, and in many instances, the revenue of the companies has been increased substantially because those in authority have realized that the increased costs must be met if service was to be continued. That continuity of service is the persuasive reason for granting relief, appears to be a fair conclusion, because public authorities have generally permitted such increase in revenues as would tend to provide the companies with funds to meet increased wages, increased cost of power and increased cost of materials and have stopped there. Very little consideration has been given the increased cost of money, for the money which is already invested must stay in the industry, and the new money necessary to permit the industry to expand and serve prosperous and growing communities is a requirement relatively remote in the minds of public regulators. Consequently, relief has not been granted to the extent that the company might compete in the open market for funds with which to extend its service to meet the expanding needs of the communities they serve.

It may be urged that it is idle in view of the general consciousness of high price levels to discuss their cause, yet the persistence of high costs is a matter of great importance. It has been said, and not infrequently, that existing high costs are temporary and that the industry should bear the burden during the few years when these costs will obtain. It would be a rash individual indeed, who would publicly announce his convictions that costs would never be lower, yet it is the opinion of many who have given this matter careful thought that the present high prices are likely to remain for many years, because the process of fattening the anemic dollar is one which cannot be hastened and which is beset with difficulties, the full extent of which is little realized. If the present high costs are but a matter of a few months, the problem of maintaining the solvency of the industry is far different than it must be if lower prices are to be experienced only after a considerable period of years.

Increases in costs, while much accelerated of late, have been in process before the war, as pointed out in the studies on cost of service made for the Bureau of Fare Research of the association in 1914. Since 1914 material prices have approximately doubled. The average wages which sustained the noteworthy increase of from $627 to $711 from 1902 to 1912, reached $906 according to the 1917 census figures, climbed over $1,100 since, and the ultimate aim of labor as disclosed by the testimony before the Federal Electric Railways Commission contemplated a minimum standard of $2,000 based on present conditions of cost of living.

From a review of the historical facts as to gold production, commodity production, changes in currency, and particularly as to the effect of wars upon prices, the conclusion is indicated that the future trend of prices will continue upon the present high level for some time. This conclusion is inevitable whether the reasoning is based upon the quantity theory of money or whether it proceeds upon other ground. The minimum period assigned during which prices will continue abnormal varies from five to ten years. This general conclusion as to future price trends must be recognized in regulating the future service rates of public service companies. Wage rates and the cost of materials will continue on a high level. This will affect the current expenditures for operation and for reconstruction, while extensions and additions to fixed plant, deferred on account of the war, must be financed on the basis of high prices.

To supply adequate credit for these future operations and at the same time to preserve the public confidence in the security of past investments, regulatory authorities must recognize the higher level of prices. Security of investment and a commensurately increased rate of return should be the fixed points toward which rate regulations must aim if the development of public service enterprises is to be placed and kept on a parity with that of other industrial undertakings.

COMPARISON OF COSTS ON HYPOTHETICAL RAILWAY

The preceding rather general discussion may well be supplemented by figures indicating in a general way the magnitude of the problem of those who are charged with the duty of continuing to render street railway service under the conditions of private operation regulated by government authority. The method to be followed will be a comparison of present-day costs of operation with those existing in 1914, through the method of applying 1919 prices to the quantities both of labor and materials purchased in 1914. There has, therefore, been assumed a hypothetical property which in 1914 carried 100,000,000 passengers for a revenue of $5,000,000. This company had 185 miles of line, practically all of it double tracked and 625 cars, including the reserve equipment necessary to permit periodic shopping. These cars made during the year 1914, 17,500,000 miles in a little less than 1,900,000 hours, or at an average speed of a little less than 9½ m. p. h.

* Abstract of paper presented at annual meeting of American Electric Railway Association, Atlantic City, N. J., Oct. 9, 1919.

The operating expenses of this company in 1914, including $500,000 or 2 per cent on the cost of its property set aside for depreciation, amounted to $3,750,000, and there was available for return on investment in the property $1,250,000, or 5 per cent on a total cost of property of $25,000,000.

An analysis was made of the 1914 operating expenses of this hypothetical company, and each class of labor and kind of material has been separated and classified. The resulting comparative condensed income account is shown in Table I.

TABLE I.—CONDENSED INCOME ACCOUNT—STANDARD CLASSIFICATION

	1914		1919
Operating revenue	$5,000,000		$5,000,000
Operating expenses (including replacement insurance) *	3,750,000		6,163,000
Maintenance of way and structures	$575,000	$875,900	
Maintenance of equipment	575,000	970,300	
Power	615,000	1,149,000	
Conducting transportation	1,225,000	2,225,000	
General and miscellaneous	385,000	492,800	
Taxes	375,000	450,000	
Net operating revenues	$1,250,000		$1,163,000 †

* Maintenance of way and structures $320,000
Maintenance of equipment 110,000
Power 70,000
† Deficit.

Each type of labor and each of the principal items of material was increased in the percentage that prices current in the latter part of this year bear to prices which were current during 1914. Use has been made of index numbers, of the records of several of the larger companies, and particularly of information compiled by this association, to determine a fair average increase by types of labor and types of material during the past five years. The operating expenses, which were $3,750,000 for this hypothetical company in 1914 would amount today to $6,163,000, or an increase of 64 per cent. This increase has been far from uniform, being least in general and overhead expenditures and highest in those expenditures which involve the maintenance of track and buildings, particularly the former. This is undoubtedly accounted for by the large increase in the cost of lumber products and manufactured metals with the fact that common labor has generally shown a higher percentage of increase than that which has been gained by the skilled and semi-skilled classes. Through organization, skilled labor has been able to effect an artificial scarcity, and early gained wage increase by this method. Today

TABLE II.—CONDENSED INCOME ACCOUNT—FUNCTIONAL CLASSIFICATION

	1914		1919
Operating revenue	$5,000,000		$5,000,000
Operating expenses (including replacement insurance) *	3,750,000		6,163,000
Costs varying with car-hour	$1,125,750	$2,049,050	
Costs varying with car-mile	876,950	1,482,720	
Costs varying with mile of single track	150,000	312,620	
Cost varying with number of passengers	332,800	486,490	
Costs of electrical energy (car-mile)	472,500	930,100	
Administrative and overhead expense burden	417,000	452,020	
Taxes	375,000	450,000	
Net operating revenues	$1,250,000		$1,163,000 †

* Cost varying with car-mile $210,000
Administration and overhead expense burden 290,000
† Deficit.

there is a shortage of unskilled labor far more acute than any artificial shortage of skilled labor which has been produced in the past.

This hypothetical company, then, which had $1,250,000 available for return on investment in 1914 would under present conditions find itself failing to meet operating expenses by $1,163,000. This would, of course, quickly result in insolvency, and many companies have already reached that stage. That some have not is accounted for by increased earnings without proportionately increased costs and by certain lessenings of expenditure, some of which are due to increased efficiency, but many of which can in no wise be termed economy. In such cases maintenance programs have been cut and depreciation reserves are being omitted for the purpose of meeting current operating deficits.

Following the practices outlined in "Costs of Urban Transportation Service," the detailed operating expenses have been separated into those varying with the different statistical units and the results disclosed in Table II. This separation is that now customarily employed in the analysis of electric railway operation.

The derived unit costs of operation may then be directly compared as shown in Table III.

Effect of Increased Business

It is of interest to carry the calculations a little farther in an effort to see what effect a possible increase in business and betterment of traffic conditions have on the deficit in net operating revenue. Let us assume first an increase of 20 per cent in the volume of business during five years and then make the further assumption that this 20 per cent increase in traffic can be carried without departing from prior standards of loading by means of an increase of 10 per cent in the car-miles operated. By intensive study and constant watchfulness on the part of the transportation department, the average speed has been increased to 10¼ m. p. h., and the number of car-hours operated is therefore

TABLE III.—COSTS PER UNIT

		1914	1919
Operating expenses (including replacement insurance)			
Costs varying with car-hour		$0.60	$1.09
Costs varying with car-mile		.05	.085
Costs varying with mile of single track		400.00	835.00
Costs varying with number of passengers		.33	.49
Costs of electrical energy (car-mile)		.027	.053
Administrative and overhead expense burden	per cent.	26.8	17.1
Taxes	per cent.		

the same as in 1914. Under conditions above described 20 per cent more passengers would produce on the 1914 rates of fare $1,000,000 in revenue and occasion operating expenses of a little less than $400,000, so that the deficit from operation is reduced from $1,163,000 to $560,000. Assuming further that the amount available for return on investment is held at the amount earned in 1914, the company must have $1,685,000 additional revenue or unit revenues of a little less than 7 cents per passenger. Nor will such revenue as this be long sufficient if the community is growing and has need for additional investment in its transportation facilities. A reasonable return on the investment, which in the light of present financial conditions must be placed at not less than 8 per cent, necessitates the addition of another ¾ cent on the fare of each revenue passenger. These computations take no account of the very serious matter of decreased riding following upon increased fares, but it is evident that if there is any serious reduction in volume of traffic the fare must approach 10 cents per passenger, which is about the figure one would expect would result from the approximate doubling in price of most of the articles entering into the rendering of service and the failure of the industry to earn a reasonable return in 1914.

Movement Charges Increased More Rapidly Than Terminal Charges

The preceding discussion has concerned itself with flat rates of fares. When an analysis is made with terminal and movement expenses, such as is necessary in determining the costs of operation under a zone system of fares, it is noted that movement costs have increased at a far greater rate than terminal costs. The detailed analysis indicates that with terminal or fixed expenses increasing 12 per cent, because of increased costs of operation, movement expenses have increased 82 per cent. This is due to the fact that movement expenses consist principally

of those varying with the car hour, comprising platform labor. Assuming an average length of ride of 2 miles, 2¼ cents represented in 1914 those costs which would be independent of the length of ride, while passenger-miles costs would be 1½ cents. On the basis of 1919 costs with no increased traffic the terminal costs would be increased to 2½ cents per passenger-mile, while movement costs would be increased a full cent per mile traveled. This indicates that the increases in platform costs are increasing the discrimination between long and short-haul riders which existed under 1914 conditions. Increases in the labor item are making long-haul traffic increasingly unremunerative. The conclusions which have been reached in previous studies, therefore, as to the paying haul for a single fare and the analysis of the cost components underlying the zone system of fares must be greatly modified because of the effect of increased wages.

Reference should also be made as to the influence of the increased costs noted upon the computations previously made of the cost of complying with standards of service. In the studies previously made under this title for the association, it was pointed out that with a typical distribution of costs, an increase of 10 per cent in the car-hours furnished during the period from 6 to 8 a. m. and from 5 to 7 p. m., platform labor would be increased 3.88 per cent; carhouse handlings 13.27 per cent, while power plant and car investment would be increased 10 per cent. Because of the large element of stand-by charge in the cost of furnishing service during rush hours there is not a corresponding increase in the labor component, as there would be if labor were under all conditions provided at a fixed rate per car-hour. It is necessary to consider, however, the very important influence of the minimum wage and the requirements of time and one-half for overtime in computing the costs of such added rush-hour service.

Conclusions Stated

1. The tendencies towards higher cost of operation noted in studies made prior to 1914 have developed into revolutionary changes in price levels.

2. It is believed that these changes are permanent rather than transitory or temporary in character and affect all components of the cost of service, including return upon the investment.

3. The analysis of cost of service made for a typical property indicates that the increases in fundamental costs incurred can only be partially offset under the most favorable and economical conditions of handling traffic.

4. Because of the large influence of the cost of platform labor, the new level of costs result in far greater increases in those costs which vary with the miles traveled per passenger than in those costs which are fixed in their nature irrespective of the length of haul. This indicates that the discrimination which has always existed between long-haul and short-haul passengers is constantly becoming greater and that our previous ideas of the cost components in a zone system of fares must be modified.

5. The increased cost occasioned in complying with higher standards of service during rush hours is vitally affected by the recent additions to costs of labor arising out of the application of the minimum wage and the provision of higher unit pay for overtime work.

Are High Costs of Service Likely to Develop Permanent Competition?*

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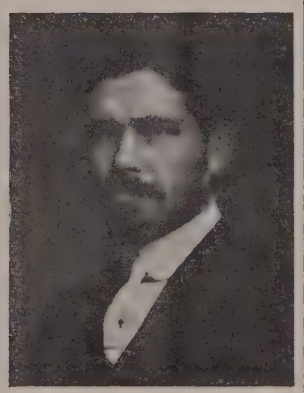

No Substitute Has Yet Been Developed for Railways in Hauling Large Numbers of People, But a Serious Effort Should be Made Effectively to Meet Bus Competition for Short Hauls—This Suggests the Use of One-Man Cars and the Adoption of a Zone System of Fare Collection—The Motor-Bus May Still Render Useful Service to the Public in Its Own Field

HIGH COSTS of service must be met with higher car fares, if the properties are to continue to operate. Therefore, this topic can be phrased another way: Will high car fares foster the economic operation of other forms of transportation, as competing agencies?

The subject presupposes, I should say, that the higher costs of service are permanent, and I believe that this is a correct statement, although it is hard to delimit or define the situation accurately. It may be reasonably expected that some expenses, principally for materials, will be reduced from their present high levels. New forms of machinery or improvements over present models will undoubtedly contribute to bringing down certain of our production or maintenance outlays. It is difficult to see how the prices of labor can recede materially, and as labor is the predominating item in the operating costs of electric railways, that fact in itself makes for the permanency of the higher expenses. Then too, in the last analysis, labor is a very large item in the costs of all materials and supplies. This condition furnishes the basis for the belief that the prices for needed articles will not drop to former levels. It seems to be the judgment of practically everyone that this country and the world in general is on a much higher price level than that existing in 1914, and that this higher level will be maintained, even though it may drop off somewhat from its present position.

As a first step, therefore, I believe that these higher costs are permanent. Will they develop permanent competition?

Possible Forms of Competition

At present the suburban steam line service is taking business away from some electric roads whose fares have been increased, but there is a movement on foot to raise suburban and commutation steam road rates to a level commensurate with their increased expenses, and such increases will rectify this condition.

I do not think we need permanently to fear the loss of business through people walking. When rates of fare are raised, people occasionally start to walk to show their displeasure at the action of the company, but this method of competition is short-lived, and it is not long before those

* Abstract of paper presented at meeting of the American Electric Railway Association, Atlantic City, N. J., Oct. 9, 1919.

who try to boycott the cars are using them whenever their business or convenience demands.

The horse-drawn vehicle has largely been eliminated by the self-propelled motor car, and as a competitor for street cars, I think we can fairly consider it obsolete and in the discard. The bicycle is used somewhat, particularly by younger people, but I think its effect upon the street railway business can be considered negligible, although the motorcycle and the motorcycle with a side car undoubtedly take away a good deal of business in the same manner as does the private automobile. When the United Railways & Electric Company of Baltimore was authorized to increase its adult fare from 6 cents cash to 7 cents cash, or four tickets for 26 cents, on Sept. 18, 1919, the bicycle dealers of the city put a half page joint "ad" in the daily papers saying "Why pay increased car fare—Ride a bicycle and save money," etc.

One of the exhibits filed with the Federal Electric Railways Commission in Washington, and contained in this year's report of the committee on code of traffic principles of the Transportation & Traffic Association, shows startlingly the increase in the total number of motor vehicles in the United States, and all our experience tends to show that the number of motor cars in the hands of the public is increasing appreciably each year.

Therefore, the competition of the private automobile from the standpoint of taking business away from the companies, both city and interurban, is most serious. Moreover, it tends to accentuate somewhat the peak load, as it takes off of the cars, in the middle of the day, many of the shopping and marketing people. It also takes away some of the later morning peak business, and earlier afternoon peak business, but does not affect appreciably the high industrial peak load. It is a kind of competition that it is practically impossible to combat, because the man who owns and operates a motor car is willing, apparently, to spend more in the operation of his car for a trip to and from work, or on personal errands, than he would spend for a similar trip on the street car.

I have drawn a distinction between jitneys and motor-buses; my idea being that the term "jitney" as a Ford or other small automobile seating five people in a touring body, or eight to twelve people in a specially constructed body usually provided with longitudinal seats. Motor-buses include the larger types of chassis and body, the biggest of which carry up to sixty people seated, when double decked. The jitney never has more than one man as a crew, whereas the largest type of motor-buses usually employ a conductor in addition to the chauffeur. The experience of the past five years has shown that the small jitney is not a permanent element, but where the factor of permanency comes in it is rather a phase that develops into the larger motor-bus, and so I have not treated this irresponsible form of transportation at any length. I do not believe over a long term of years the jitney is a serious menace to street railway traffic, but I think that of all the forms of competition specified, the motor-bus is the one which holds the greatest possibilities of permanent competition.

The trackless trolley has not been utilized in this country to any degree, and from what I can learn of its operation abroad there seems little to recommend it. It can be dismissed, therefore, with merely a passing reference. The field for its operation is likely to be pre-empted on the one hand by the trolley car, if business is heavy, and on the other hand by the motor-bus in sparsely populated sections. Competition due to steam or motor-boats is largely a special situation, and one that will not be experienced by many companies.

Competition in Freight

Turning now to the question of freight, we find that where high costs are reflected in increased freight charges, the suburban and interurban electric railroad is faced with the possibility of motor-truck operation for competition in handling freight. This is dependent practically always upon the provision of good roads by the state or other authorities, for which the motor-truck operator pays practically no charge.

In addition to the actual kinds of competition which have developed, there are other factors which have a material bearing not only on the character of the competition, but upon the extent of its permanency. Among them are public regulations, taxation, including highway or road maintenance, the attitude of the public and the public authorities, physical conditions, limitations of congestion, the operation and handling of the street car service, and the method of collecting the higher costs from the public.

There is a realization on the part of many people, including a number of public officials, that electric railways are being ground down too hard by heavy burdens of taxation. As an instance, all fair minded men conversant with the situation recognize the fallacy of the trolley companies paying the first cost of pavement and later for the maintenance of paving as done under the present general practice. The levy of such kinds of special taxes against street railways, where service-at-cost plans are effective, is recognized clearly as having to be met by the car rider; hence the distinct trend away from tax burdens where such plans are in effect. While on the subject of public restrictions and burdens, it is interesting to know that the employees of the electric railways recognize the unfair character of the present competition. When like burdens are placed upon the motor vehicle as upon the electric car, it is going to discourage in great measure this form of competition.

The independent bus operators usually also have the indulgence of the public, being looked on as individuals who are trying to make a living, and the motion of persons bucking a big corporation creates sympathy in the minds of many. Where it is possible, however, to make the citizens of the community realize the benefits conferred upon it through the development and safeguarding of regular and dependable service on the electric railway, the sentiment in favor of motor-bus operation is likely to be negligible, and if allowed to operate, the competing agency will not be permitted to escape bearing its just portion of the burdens of taxation and operation. Here is an argument for intelligent publicity that you must all recognize as vital.

Results from Railway Buses in Baltimore

In Baltimore, the United Railways & Electric Company has been operating a service of one-man motor-buses, seating sixteen people, for over two years, as an alternative or supplemental service. As such, it has fulfilled a distinct purpose; as a money-making proposition it has not been a success. After proper reserves are set up for accidents and depreciation and after taxes (and we have heavy tax burdens in Baltimore) are allowed for, we feel that the service has done well to break about even on operating expenses, depreciation and taxes. We had a costly accident, due to a collision with a gasoline tank wagon which resulted in the gasoline catching fire and seriously burning some passengers, and it will take some years to wipe that account off our books. Had it happened to an independent company with only its bus operation as assets, the business would have been wiped out. It seems to me also that the Fifth Avenue bus operation in New York is largely a supplemental service, rather than a directly competing one.

The rising tide of operating costs affects bus operation as it does electric railways, our wages for chauffeurs and automobile mechanics are high, and the prices of the various supplies needed, including tires, gas and oil, have increased by leaps and bounds. The motor-bus is not immune from the much discussed "high cost of living,"

and the same economic factors affect it as affect electric lines. It is not clear, therefore, why under approximately equal conditions, motor-buses should have any especial advantages enabling them to operate much less expensively than street cars.

BUS OPERATION CONSIDERED

In studying this question of competition, one of the significant facts is the short haul that is given by jitneys and motor-buses for a 5-cent fare. This is noticeable in New Jersey where the traffic counts of the Public Service Railway show that most of the business taken away from the railway is composed of passengers living within 3 miles of the center of the city and much of it within 2 miles. The Fifth Avenue Company in New York City charges 10 cents. The motor-buses that have recently been put on some abandoned storage battery, crosstown routes in New York City are operating distances of only about 3 miles, with no transfer privileges. In a recent prospectus of a new motor company that announces ambitious plans for inaugurating bus service in large cities, it states: "The 5-cent rate of fare for every 3 miles of route will be the approximate rate of gross income." Obviously, the average length of passenger haul will be less than 3 miles. This draws attention distinctly to the fact that at present the street railways are being penalized because of their long single fare routes. The long-haul riders are being carried at a loss and are eating up the net income of the companies. How long could the motor-driven vehicles compete with the electric railways if compelled to operate at present the long routes and the unprofitable ends of schedules and service as we have to do?

At this point it might be noted that the extent to which these higher costs of service develop competition in any of its forms depend upon how these higher costs are collected from the public. For instance, in the case of a pedestrian: If the fare charged for a short ride is 3 cents, and the service is frequent, he will nearly always ride; but, no matter how frequent the service, if a 10-cent fare is charged, he will often, if not usually, walk. Supposing, as an extreme example, the fare is 20 cents: The potential short rider would always walk except during very inclement weather or when in a great hurry.

There are no bus fares of less than 5 cents, to my knowledge, and their charge in city service is usually 5 cents. Now the greater the differential between higher car fares and the bus fare, the greater the opportunity for permanent short haul competition. Such conditions point towards the absolute need of apportioning the increased costs of service over the traffic in accordance with its ability to pay. That, I believe, presupposes some general relation between the fare demanded and the cost of service based on length of haul. This forecasts the need, under such conditions, for some sort of zone system, or else some special inducement to short riders. The situations surrounding individual properties will have much influence in determining the forms that these fare systems will have to take in order to be effective in retaining business and meeting competition.

PHYSICAL AND WEATHER CONDITIONS ARE FACTORS

Physical conditions have a good deal to do with the possibility of permanent competition. Cities that are built on comparatively level ground with wide streets and smooth pavements offer a much better field for operation than those with narrow streets or severe grades, or where much of the paving is poor.

Similarly, for interurban passenger or freight transportation by motor truck, a smooth and well built highway is essential. Most of us are familiar with state roads, constructed for the use of the people as a whole, which have within a short time been worn down and torn to pieces by heavy motor trucks, whose operation has brought little, if any, benefit to the district which has paid for the roads, but on the other hand has taken away revenue from agencies already established which were in a position to handle the traffic.

The question of weather conditions is another factor affecting competition. Where winters are severe, the motor-bus operates with much less dependability and regularity, and to that extent is not so efficient a public carrier as the electric road. To electric railway men it seems manifestly unfair to let a competitor take away the easy, more profitable and fair weather business, but when travel is light, as in the evening, or when it is stormy to have this competitor fail to operate and expect the railway to provide the service needed.

In the larger cities, the problem of street congestion due in great part to the private automobile, is a most serious one, and even under efficient traffic regulations, and traffic regulations as a rule are none too efficient, the limit of effective capacity of many important streets is reached, during busy portions of the day. Under such conditions, the introduction of motor-buses adds a complication which operates seriously against the free movement of all classes of traffic through the city. Due to the generally smaller carrying capacity of the buses, it would be impossible in many places to provide the same facilities with motor-buses that are now furnished by street cars, without completely filling the highways, and retarding vehicular movement to an intolerable degree.

CONCLUSIONS

To sum up then, there is no question but that the field of usefulness of the street car in the public service has been limited and is being restricted through the increasing use of private automobiles, particularly during the middle of the day and the evening hours. But for handling great numbers of people from their homes to their work and back again, there is no substitute that has been developed that will take the place of an efficiently operated street car system, excepting, of course, elevated and subway roads.

Such a car system comprehends frequent service, proper routing of cars, prompt handling and dispatching, comfortable, clean and well maintained rolling stock, adequate and well kept up plant in other departments of the operation, efficient transportation department work, courteous and alert crews, and a sustained and constant effort to serve and please the traveling public.

In most cities, it will mean the operation of numbers of modern light weight, one-man cars, enabling the provision of more frequent service. A zone system of fares will help to equalize the competition with motor-buses, and the results of the struggle in New Jersey, where the initial zone ride can be had for 3 cents, it is thought will throw some light on this question before long.

As a supplementary service, and for purposes of traffic development, the motor-bus has a field of distinct usefulness and one that we should avail ourselves of to the utmost. The motor-bus must be accepted as an auxiliary to our present service. Under equal conditions, and with fair regulation and public control, and with efficient operation on the part of the electric railways, I believe that the higher costs of transportation will not as a rule, make for permanent competition, for the costs of bus operation are rising about evenly with those of electric railways. It will be necessary, however, for the operators of the roads to meet the problem intelligently, and with resourcefulness. They must meet the new situation open-mindedly, and they must have the vision and the courage to break away from the old practices and methods of former days.

Can Service Costs Be Collected from the Traveling Public?*

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Railways Must Be Grouped in Accordance with Their Ability to Collect Higher Fares—Some Cannot Be Made Self-Supporting, Others Can Be Re-established Financially if Permitted to Charge More, While the Remainder Which Constitute the Largest Number Occupy an Intermediate Position—The Situation Is Analyzed, and Five Conclusions Are Given

THE QUESTION of whether the costs of production can be collected in the selling price of goods and service is not limited to the street railway industry. The same question confronts the producers of many essential commodities. It is not confined to this country; it confronts the producers of coal, steel and transportation in Great Britain. It is likely to confront the producers of coal and transportation in this country. The high costs of production appear to be most serious in those industries where the amounts paid labor form large proportions of the total cost and where the further use of machinery to reduce labor effort is limited by what are apparently natural conditions.

That cost of production may, through increased wages and reduced quantities of production, so raise the selling prices of commodities as to place them beyond the reach of the ordinary populace and even of many industries, seems to be sensed by labor leaders although it is not yet openly acknowledged. This economic trend forms the real background of the demand for the nationalization of British coal mines. The advocates of nationalization hope thereby to attain much higher wages and earnings than are now considered practicable where private industries must pass the costs on to the consumers. With the nationalization of the mines the government may subsidize their operation, *i. e.*, absorb a part of the costs of production through taxes and assess and collect taxes from the individuals according to their ability to pay.

As a plan for changing the relative distribution of income, it possesses merit. As a plan for increasing or conserving wealth or rewarding producers in accordance with their efforts, it fails dismally. The scheme of nationalization of mines and other industries has been designated socialistic. To the extent that it contemplates a complete redistribution of income and a large reduction in human effort, it is not socialistic. But fundamentally, it is no more socialistic than the general labor movement as we know it in America. It is only a matter of extent to which the advance toward the ultimate goal has been completed.

The electric railway that has during the last two years collected from riders all the reasonable costs of service is an exception. If any such railway exists, its fame has not extended beyond its own community. The costs which have been most difficult to collect are those resulting from increases in wages paid to labor, as shown by Mr. Doolittle; these form by far the largest proportion of the increases in cost of service.

Electric railways divide themselves into four classes in their attempts to meet the increased costs of service, viz.:

1. Railways that have not been permitted to increase their rates;

2. Railways that have been permitted some increase in rates partially to meet increased costs;

3. Railways that have been permitted to increase rates to as high a level as the operators thought wise and where the increased costs have only been partially met;

4. Railways that have not raised rates because the operators feared that higher unit fares would result in less aggregate revenues.

In our subsequent discussion we are not so much concerned with the legal and economic limitations on rates experienced in the past as we are with the conditions that now confront us.

Railways now divide themselves into three classes as affecting their ability to collect increased costs through larger revenues, viz.:

1. Railways so situated that increased costs cannot be met out of any possible increased revenues that can be collected from the car riders;

2. Railways so situated that all increased costs can be readily collected by either an increase in unit fare or adoption of a distance tariff scheme of fares;

3. Railways falling in the twilight zone, lying between the classes first mentioned where increased revenues may be obtained by forced stimulation, which if continued sufficiently long and accompanied by proper changes in service and scheme of fares can be made to produce the higher costs of service.

The future of electric railways which cannot be made to support themselves holds out no hope for private owners. There are three alternatives open to such railways, viz.:

1. They may be abandoned as have already many such railways;

2. Their operation may be subsidized by taxation so as to produce a guaranteed return on the invested capital;

3. They may be operated by the government authorities and supported by taxation.

The railways which fall within this class have not been definitely determined. They are more generally confined to the smaller cities, where density of possible traffic is small and where walking competition is keenest because of short distances of movement. Most of us know of one or more electric railways which fall within this group. There is no kind of cost-of-service plan which will keep these railways going.

The tax-subsidy plan of support affords whatever advantages private operation may offer, but its working out for best results is complicated and difficult for the people to understand; it also imposes upon the private owners substantial obligations appertaining to the supply of future capital. Then, too, constitutional provisions in some states will prevent the enactment of legislation necessary to make the subsidy plan operative.

The simplest and most readily understood solution of the problem of this group of railways is public ownership with operation reinforced by taxes.

The railways that can readily collect the increased costs of operation if given authority to do so, permit no extended

* An address delivered before the Atlantic City convention of the American Electric Railway Association, October 9, 1919.

mention in this discussion. Such railways will generally consist of those serving large populations of high density where the length of passenger haul is long and the service is high speed. The New York subways are typical examples.

The position of the ordinary electric railway falling in a group lying between the extremes just discussed is not so clearly defined. It is to an inquiry affecting this class of railways that this discussion is primarily directed.

MONOPOLY IDEA EXPLODED

For a good many years the electric railway was regarded as a monopoly. It was viewed as a menace to the social order which must, under no circumstances, go unrestrained. It was, if recollection serves, even denominated a double-dyed monopoly arising first from the special privileges which it exercised in occupying the public streets, and second because its natural characteristics made it impossible, even though the opportunity for competition existed, to supplant it. The idea of monopoly carried with it exclusive control of price and such necessity of use as compelled people to pay the price. The only limit to the price according to the then prevalent theories was the ability of the customer to pay. What the traffic would bear was generally considered to be the amount of loose change the average passenger customarily carried in his pocket. Collecting costs of service from the traveling public according to this theory was simple. The only question was how much more in monopoly profits the street railway company could get away with.

One of America's foremost economists, thirteen years ago, said, "There is evidence going to show that the price for street car service in our great American cities which yields the largest net returns to the street car monopolist is 5 cents. Apart from all legislative control, it is not probable that in our great cities it is in the interest of the owners of street car property to charge more than 5 cents. With our high average of well-being and our readiness in the expenditure of money, a 5-cent fare reaches down into the masses of the people. Doubtless it is too high a fare for the lowest social strata, and yet it reaches so far down that probably the increase in traffic from a lower fare would not offset the loss in profit on each passenger transported. In a country like Germany, on the other hand, a 5-cent fare would probably be too high to yield the largest net return to the monopolist, inasmuch as, with the lower general average of economic well-being and the greater frugality, a fare so high would not reach down far enough into the masses of the people to induce a sufficiently large traffic to be most remunerative."

Based upon this preconceived idea of the fundamental nature of the business, public regulation was brought into play fixing the price in the privilege or franchise conferred, and commissions were created to chasten and curb this natural monopoly. An effective straightjacket was placed upon the industry.

"The sting of private monopoly," said another text-book writer ten years ago, "lies in the fact that without competition to keep rates down to a basis of cost, including reasonable profits, the natural tendency of those in control of the business is to establish rates at the point where they will yield the maximum of profit taking into consideration the amount of the business. The first requisite of a good franchise is to pull the sting of the monopoly."

The monopoly idea was a perverted economic notion. The special privilege to occupy the streets turned out to be a privilege to pave and clean the streets for the use and benefit of any other kind of transportation. The reputed natural characteristics, which were presumed to charm off competition, never caused Henry Ford a moment of anxiety. The economic regulation which compelled people to ride somehow was supplanted by the legal regulation which compelled the cars to travel whether the people rode or not.

Even the attitude of economists has changed. The writer last referred to appeared before the Federal Electric Railways Commission two months ago. He is quoted as suggesting that fixed-fare franchises are now a liability and not an asset as they had been in years gone by, and that this fact should be considered to the advantage of the city in arriving at any valuation. In other words, having removed the "sting," he is now out after a portion of the "hide."

Where regulating officials finally conceded the necessity for increased revenue and attempted to increase existing fares, they found to their surprise that traffic did not respond the way it was reputed to respond in a well-intrenched monopoly. They found that a 40 per cent increase in unit price failed to produce a 40 per cent increase in revenue, and relief which was conceived to be adequate generally fell far short of being even an emergency ration.

SIMILARITY WITH OTHER BUSINESS ENTERPRISES

The problem of collecting the costs of service from the traveling public must be viewed on the same basis as that of price determination in any competitive enterprise. There must be stability of market, the price must be within the patron's ability to pay, the confidence and good-will of the purchaser is essential, consideration of the factors of custom and competition is important and the psychological appeal must be such as to induce liberal patronage. Enterprises which can achieve these essentials of salesmanship and collect the cost of the product or service sold, including a commensurate return, are successful enterprises.

The flat rate failed principally because it ignored several of these principles. Its miscalculation further lay in the disregard of change in length of haul, character of service and higher standards of comfort which, with increase in fundamental costs, resulted in the failure to yield the cost of service.

No one will question the stability of the market for our service. The trend of our population has always been toward the city, and under present conditions will continue to be so. According to the 1917 census estimates, there are 219 cities with a population in excess of 30,000. These account for 32 per cent of the total population of the nation. In 1890 at the beginning of the traction industry there were only 103 cities of this size comprising 20 per cent of the total population.

Our prosperity as a nation has resulted from the growth of our cities. Our huge advance in national wealth arises from city products. During the period 1912 to 1917, when net income of the electric traction industry, according to the census figures, decreased 17 per cent, the assessed value of property in the 219 cities now over 30,000, increased 23 per cent. This increase in land values aggregating nearly $7,000,000,000 exceeded the total investment in the entire electric traction industry.

Increased centralization and congestion, with inability to widen thoroughfares once established, result in making traffic on rails the most feasible and economical means of city transportation. So certain is this process of concentration that capital is attracted to centrally located realty at smaller returns than that prevailing in any other form of private enterprise. The stability and growth of the market for electric traction service is assured.

What price can the community afford to pay for such service, and is it possible to collect it from the traveling public? During 1917, before high prices had confronted the industry, the average operating revenues, according to the census, were $15.20 per capita, less than 3½ per cent of the income per capita, and a little more than 1 per cent of the estimated true value of the realty per capita. The charge for the most important service that makes city life possible is, in fact, of small proportion, and to double it would add no hardship to the community. The annual expenditure, for luxuries, such as talking machines, silk shirts, and the opera-

tion of pleasure automobiles, far exceeds the total increased revenues needed to restore the electric railway industry to a solvent and flourishing condition. The question is not ability but willingness to pay the actual cost of service.

Psychological Causes of Present Disabilities

We come, then, to the first of the intangible considerations—the confidence and good-will of the purchaser. The American citizen has a reputation for being a free spender but he is mortally afraid of being "stung." The success of the small storekeeper, in spite of his frequently unconscionable surcharges on the cost of living, lies in his apparent hard-working honesty. Confidence begets trade. No business, no matter how carefully it may follow the Old Testament prohibition against usury, could survive the persistent attack upon its essential honesty that has been directed year in and year out against the electric traction industry. The additional patronage that grows out of good-will means the difference between mediocre and good business. The loss of patronage that comes with boycotting means the difference between mediocre business and failure. The railway business labors under a peculiar handicap; it is the only business which is required to discriminate between its patrons. The passenger who is required to stand feels that the passenger who enjoys a seat is being favored. It can never be placed in as favorable a position as other businesses until this discrimination is done away with or compensated for in the price paid for a ride.

How this confidence may be re-established is not a mere problem of public policy or public education. It is far more fundamental. So deep-seated has been the idea that the street railway business is a profiteering institution, that even where bankruptcy is apparent to everyone it is complacently regarded as a sort of poetic justice. Fair value must be determined, earnings must be audited by disinterested tribunals. The fact that the business is under strict regulation which does not permit of profiteering must be firmly established and thereafter every attack which ignores these facts must be fought and resented in the same way that any law-abiding citizen would resent being called a crook. We are so well advised as to the motives underlying such attacks, that we are prone to disregard them as "old stuff." And, so the process of attrition gradually operates against a business because it lacks personality. The demagog and venal press are as cowardly an outfit as any blackmailer, and they can be reached through fearless and aggressive publicity.

Systems of Pricing Service

It is not alone the protest against unreasonable profits which leads to decrease in patronage, but dissatisfaction with any price system which permits one patron to get more for his money than another. No merchant would expect to satisfy all his customers by a policy of selling them clothing, groceries, etc., on the basis of their needs at a fixed price irrespective of their requirements. Yet, this is exactly what is happening with the flat rate of fare. The patron who is paying a flat fare for use of the street car for a short ride feels that he is not getting his money's worth compared with the passenger who gets a longer ride on the system for the same price. Disregarding other considerations, a distance tariff should be more conducive to restoring confidence than a flat rate.

Custom and competition are two considerations of importance when making any change in price. The customary price for the same service is a large handicap where it is necessary to increase the price if volume of sales are to be maintained. The baker recognized this fact with the 5-cent loaf. He decreased the size of the loaf rather than increase the unit price. It was not until the strong arm of the Food Administration was imposed that any successful increase was made over the unit 5 cents. The tobacco, drug and candy industries have recognized the same fact in gradually decreasing the size of package for the same price. It is not necessary to refer to the many devices of the able merchant in overcoming this difficulty. Changes in trade name, supposed changes in the quality of goods, fundamentally different processes of merchandising, are all utilized to overcome the barrier of custom.

We frequently hear the statement "give better service and the public will willingly pay increased fares." Assuming that headways are regular and not inconveniently long during non-rush hours, increased service according to accepted standards would consist in increasing the number of cars used during rush hours. This very costly increase in equipment yields a very limited increase in service and it is doubtful whether the change in service standards would make any marked impression upon the traveling public. European practice of first and second-class service, the first with, and the second without seats, has remote possibilities. The railroads are gradually approximating classified service through extra-fare requirements.

Meeting Competition

The principal competitors of the street railway are, of course, walking and the automobile. A price system must be designed to minimize the effectiveness of this competition. The competitive advantage is not merely one of cost but of convenience. Taxicab service is, of course, many fold more expensive than street-car service. The additional price paid for the average convenience is very great. Considering the normal cost per capita of street railway service and the advances in the price of shoes, it is questionable whether the walking route is as cheap as it seems. The distance tariff has, of course, great advantages over the flat rate of fare in minimizing competition. The radius of the automobile for hire is short and the inducement of low fares to reduce walking should be substantial. The highest practicable speed of cars is essential, since the sacrifice that competes with money expenditures for a car ride is that of time rather than of physical effort in walking. Frequency of car service produces reactions similar to those of speed and comfort.

It must be confessed that there is no particular psychological appeal in the traction business as now constituted to induce liberal patronage. It cannot adopt as its motto "The more you ride, the more you want to." Time was, when the rail was flanked by cobblestones and wooden sidewalks and a trolley ride was our most popular outdoor sport.

Is it possible to restore the old-time zest and flavor? Other competitive businesses have done so. The old-fashioned drug store, when the population became too disgustingly healthy to require patent medicines and a few prescriptions, blossomed forth with soda, candies, cigars and minor household furnishings; the Yankee notion corner was transformed into the 5 and 10-cent store; and the barber shop threatened with rapid extinction by the safety razor, transformed itself into a beauty parlor and raised its prices besides. Is the industry lacking in constructive imagination? Or, is the trolley ride as prosaic as a postage stamp which it does not pay to flavor to induce use? The low number of rides per capita, less than one ride per day—indicates a minimum of patronage, an absence of convenience or pleasure riding and a dearth of salesmanship. We call it "the riding habit," a proper designation. Riding is habitual and forced, rather than attracted.

The street railway performs a personal service, in most cases to a tired customer. The personal service required is as much a rest as it is a ride. Mental and physical fatigue contribute largely to the critical attitude toward the service. There is little complaint from the morning crowd; there is much complaint about the evening rush. Frequency of stops, low speed and the monotony of the journey are the main reasons for discomfort.

The service can undoubtedly be made more comfortable and more satisfactory even though more expensive. But, in the interest of the passenger it must popularize travel during the non-rush hours. It must meet the insane demand to go home *en masse* by persuasive appeal to go home a trifle earlier or later in comfort. No employer can withstand the demand for staggered hours, if the laboring man wants it. Smoking privileges, moving pictures, barber shop literature, jazz music—there is some solution awaiting the genius of salesmanship.

An analysis then of the possibility of merchandising street railway service, considered as a competitive business, leads to the conclusion that, given a free rein like any competitive business in the making of rates and in arranging service, there are prospects of collecting the increased costs of service from the traveling public.

Effects of Changes in Fare Scheme

Any change in fares, whether increases in flat rates or change from the flat rate to the zone or distance tariff, carries with it a disturbance of traffic. If we analyze the reaction we find that this may develop into three phases. There exists first a temporary withdrawal of patronage—a sacrifice of usual comfort in the interest of economy—often unconscious but evident in total sales. Gradually there is a recession to normal conditions. There may be in addition a feeling of resentment greater than any pocket interest. In this second phase, withdrawal of patronage may constitute a boycott more lasting in its effect on traffic. Finally a protest so severe may be encountered as to result in mob violence and actual interference with service. How lasting these impressions may be and what can be done to prevent or overcome them are local problems of salesmanship. The success of the business depends upon voluntary patronage and the problem of transition in price is of importance.

A flexible plan of fares which will move the traffic, and which will permit of minor adjustments, up or down, from time to time is also important. The railroads were more fortunate than the traction industry. They determined their own scheme of rates, based entirely upon the theory of charging what would create and move traffic. The differentials thus instituted became fixtures which even regulation, when it arrived, could not disregard. Difference in charges for the long and short haul, difference in charge for on-peak and off-peak traffic, difference in charges for summer and winter service, commutation rates and special fares, are all possibilities that merit consideration.

The effect of fundamental changes in the basis of fares upon existing realty values has been of concern in some quarters. There is a feeling that the existing rate of fare is a sort of inalienable property right attached to the real estate which must not be disturbed. Investigation shows that the effect of rates of fare on actual realty values has been much exaggerated. No doubt existing fares are a persuasive talking point for the real estate promoter but their influence because of the small annual charge involved has been proved to be negligible. The existence of a wide, flat-fare area did not promote settlement, and the existence of a zone fare or distance tariff did not hinder development. And realty can no more lay claim to permanence of street car fares than it can to permanence of the ozone laden atmosphere and the unrestricted view that originally surround it.

By-Products of the Business

This discussion would be incomplete without some reference to the question: Has the traction business any by-products which may augment its revenues? Undoubtedly the rate of fare which it is necessary to charge the traveling public to meet the cost of service will be affected by the possibility of auxiliary revenues. Concessions in passenger cars in addition to advertising may be an important source of revenue. Express, package delivery and mail, if it is ever permitted to carry a fair charge, also merit more intensive cultivation. Finally, the possibility of utilizing idle or lightly-loaded tracks for the movement of freight, building materials and the collection of ashes and garbage, with or without auxiliary automobile truck service, are worthy of consideration. These latter services raise problems of city planning and can only be brought about through the initiative of municipal officials. These services would tend to relieve congestion and reduce wear on pavement, and would largely expand the territory available for small manufacture by providing transportation facilities now limited to frontage on railroads and docks.

Conclusions

1. The high price levels of the last few years with the resulting increases in costs of electric railway transportation have required increases in selling price of the railways' product. Increases in flat fares have resulted in either decreased volume of business or lower rates of increase. These facts, together with the prevalence of gasoline-motor competition in certain sections of the country have raised the question as to whether it is possible for the electric railway industry to collect from the traveling public the increased costs of service.

2. Railways naturally group themselves into three classes. The first class embraces those electric railways where the conditions are such that there is no hope within any reasonable length of time of making the railway self-supporting by any adjustment of fares. The second class embraces those railways which by reason of density of traffic, length of haul and speed of service readily permit the increased costs to be collected either by an increase in flat rate of fare or by adoption of some distance tariff scheme. The third class comprises those railways lying midway between the first two and where there appears to be an opportunity to collect from the traveling public the increased costs of service without making the service so expensive that it is unattractive, but which will require changes in the scheme of fares and the adoption of changed methods of operation.

3. The factors which have permitted other lines of business to remain prosperous during these periods of high price levels and even to enlarge their volumes of sales are numerous and afford many suggestions to the electric railway industry.

4. The psychological aspects of increased fares and the mental reactions caused thereby group themselves into three classes, finally developing into mob violence. Reactions of this kind must be anticipated, prevented if possible and in any event minimized if the electric railway is to retain its dominant position as a transportation medium and compete successfully for new capital with other lines of industry.

5. The real question confronting the regulating authorities to-day is not that of preventing the electric railways from earning too much but rather that of permitting the railways to earn sufficient revenues to continue to operate, maintain their credit and to expand their facilities. Electric railways should be given greater freedom of action in determining upon the form and magnitude of their rate schedules and in the character of service which they render.

6. There are what may be called by-products of the business which electric railways, if possessed of ability to procure additional capital, may exploit with profit. The development of such by-products would assist in restoring the electric railway industry to the position of a going business and go some distance in making it unnecessary for municipalities to lend their credit in the purchase and expansion of the ordinary surface electric railways and to lend their taxing power in supporting railway operation.

7. The opportunities for selling higher priced service seem to be sufficient to warrant a serious attempt and the chances of being able to collect the increased costs are now greater than the chances of failing to do so.

WALTER A. DRAPER

R. P. STEVENS

J. E. HUTCHESON

Essential Features of the Service-at-Cost Plans

Up-to-Date Information Upon the Working of the Cost-of-Service Plans at Each of These Important Cities Is Given by Railway Men Who Can Speak with Authority

Cincinnati

BY WALTER A. DRAPER
Vice-President
Cincinnati Traction Company

Youngstown

BY R. P. STEVENS
President
Mahoning & Shenango Railway & Light Company

Montreal

BY J. E. HUTCHESON
General Manager
Montreal Tramways Company

Some Elements of the Cincinnati Franchise*

A Valuation Was Reached by Agreement, Then a Flexible Fare Was Allowed Depending Upon Degree of Operating Efficiency

BY WALTER A. DRAPER
Vice-President Cincinnati Traction Company

THE Cincinnati settlement was not undertaken purely because of the war conditions nor had the Cincinnati company reached the end of its franchise. On the contrary, the company had a franchise with many years yet to run, with a provision in it, however, that twenty years after its date it could be revised by the city as to all its terms and conditions and a rate of fare fixed "according to the then cost of carrying passengers" and a further revision period fifteen years later. The first revision period fell at a time when any revision of fares based on the cost would necessarily have been upward. Instead, however, of fixing a rate that would be equitable according to the "then cost," which would have to remain in effect for the next fifteen-year period, the City Council adopted the plan by which the rate of fare should be equitable according to the cost at any and all times.

The provision regarding revision was one of the points in an attack upon the legality of the revision ordinance, it being held that the original framers of the State law, and the franchise granted thereunder, had no intention of providing for a revision upward and the provision, therefore, could be used only for a revision downward. The court, however, held that no matter what the framers of the act had in mind, the language was clear and the power to revise according to the then cost must contemplate a possible upward as well as a possible downward revision. The court also held, as to the claim that a sliding scale under the service-at-cost plan was not a fixing of the rate according to the then cost, that, as a matter of fact, the service-at-cost plan was a most equitable way in which the rate could be made to be according to the "then" cost at any and all times.

VALUATION MADE BASIS

As in all service-at-cost ordinances, the valuation was the foundation upon which the structure was built. This was gone into most completely. Three years before the work of drawing the revision ordinance was begun the city asked the Public Utilities Commission of Ohio to make a valuation of the property of the Cincinnati Traction Company, as under the law it could do. The commission in turn ordered the company to make a complete inventory and appraisal of the property as of a certain date and proceeded through its engineers to check the inventory as it was progressing. The work consumed many months and the resulting physical valuation showed not a great difference as between the finding of the two sets of valuation engineers, though in the matter of superseded values, overhead and franchise values there was a wide divergence. The cost to reproduce new was found by the commission to be $27,378,851.88 and by the company $27,640,490.22. The commission allowed for superseded values, paving, etc., an amount bringing the total valuation up to $30,141,-102.87, while the company's claim for the same things brought its figure up to $33,198,567, with a claim for franchise value in addition, which was disallowed.

The valuation finally used in the ordinance, however, was reached by agreement, both the city and the company having protested the finding of the commission, but agreeing between themselves. The valuation in the ordinance was arrived at by recognizing outstanding securities which represented very nearly the cost-new valuation found both by the company and the State, together with an allowance for superseded value, and was $31,847,950 for the purpose of calculating the return and $30,847,950 as the purchase

* Abstract of paper presented at meeting of American Electric Railway Association, Atlantic City, N. J., Oct. 8, 1919.

price. In addition to being able to purchase the plant for that figure, the city can, if it prefers, bring condemnation proceedings and secure the property at the price awarded in such procedure.

The control exercised by the City of Cincinnati is divided between the legislative and the executive departments, the City Council exercising all functions in relation to the rights of the company under the grant and any changes therein and also all extensions, routes and motive power. In an official created under the city charter, known as the Director of Street Railroads, an appointee of the Mayor, is vested the control of service, type of cars, transfers, contracts, accounting, budget, kind, amount, rate and purpose of new securities; and in short every act and every expenditure bearing upon service and its cost. Understanding this complete control which is retained by the city in return for granting the company the right to charge fares that will yield revenue sufficient to meet all requirements, the reason for a budget of expenses, incentive to economical operation, elasticity of depreciation charges, cost of money, etc., will be the more readily understood.

Special Features in the Franchise

One of the knotty questions to be solved was the disposition of the franchise tax paid to the city. For years the company had been paying a tax of 6 per cent on its gross receipts, amounting in the year of the revision approximately to $325,000. Two opposing ideas clashed in the treatment of this matter. One held that as this was to be a service-at-cost arrangement the street railway system should not be made a special tax gatherer for the city, but the car rider should have his ride at as low a cost as operating expenses, statutory taxes and return on investment could allow. The other school adhered to the idea that a great many car riders pay no direct taxes to the city, and it was but fair that they should contribute in this way, especially as the company pays no paving charges, except for paving disturbed. That this 6 per cent tax amounted to a third of a cent on every car ride was used as argument by both sides, one contending that so large a tax should not be put on the car riders and the other holding that only a third of a cent ought not make any difference to anybody. The fact that the city needed the revenue was, after all, the deciding factor, and the car riders now pay in the aggregate $350,000 a year as a special tax to the city. This payment, while made as certain as the company's return on investment, is not paid until after that return, however, thus strengthening the company's position financially.

Particular effort was directed by those framing the revision ordinance to secure the greatest degree of elasticity. In the matter of rate of return, for example, those securities already outstanding and accepted as part of the valuation are allowed the rate of interest heretofore paid on them, which in one case is as low as 5 per cent. Instead, however, of fixing a certain rate on all future securities it is provided that the allowance shall be exactly what the new money costs, and the safeguard is then thrown around this provision by requiring that the amount, character, rate, method of retirement and price at which new securities are sold shall all be subject to the approval of the city and the Public Utilities Commission of Ohio.

In the matter of depreciation, the amount and the method as now charged by the company are retained for a period of five years, after which the Public Utilities Commission will fix the rate of depreciation charges.

Probably the most strikingly elastic feature of the ordinance is that which exercises the control of expenditures. Instead of a certain allowance for operation in various accounts, which experience has shown must vary from time to time requiring negotiations with the city for changes in such allowances, the Cincinnati plan compels the company to file with the Director of Street Railroads forty-five days before the end of the calendar year, an estimate of gross receipts and budget of operating expenses for the ensuing calendar year classified under the General Accounts of the I. C. C. system. No expenditure can be made in any of these general accounts in excess of the budget allowance except upon supplementary estimates approved by the director.

The operation of this budget plan puts the company in the position that it can insist and show clearly that the allowances for the year should be sufficient to operate the property and keep it in repair, and if its estimates are not allowed it has recourse to arbitration. Furthermore, if the city desires to increase the budget estimates to meet its demands for greatly increased service, the building and operation of many extensions or an unusual amount of track reconstruction, all in excess of what the company estimates should normally be or can be done without increasing fares, the company may point out what it will mean if the estimates are so increased, and the increases are then made with a full realization by the Director of Street Railroads and by the car riders that it will mean higher fares. It is not a case of shifting responsibility but merely of giving the people who pay the bills the option of deciding.

Considerable attention was given in drawing the ordinance to securing a plan that would put changes in rates of fare into effect as expeditiously as possible, and the result was the adoption of a rule that is automatically acting. If in two calendar months before the reserve fund is established the receipts are not sufficient to meet the requirements the next higher rate of fare must be put into effect at the first of the next calendar month. There are no preliminaries except fixed periods of advertising and posting of notices. Reports to the city and approval by the city are unnecessary because the books and accounts of the company are not only open to, but are being subjected to, constant examination by the city, there being an accountant representing the Director of Street Railroads in the accounting office of the company at all times. So, the city is completely advised of the situation, thus making formal notices and approvals a mere unnecessary formality.

After the reserve fund is established naturally the change in fare upward or downward will not be made on two months operation, but deficits will be paid out of the Reserve Fund until it is reduced to below $250,000. This reserve fund is first established by $250,000 from the sale of securities and then from gross receipts until it reaches the sum of $400,000 which is called the Normal Sum of the Reserve Fund. It can then be used if need be, but fares cannot be reduced until there has been a further accumulation up to $650,000.

Consideration of Franchise

During the public hearings on the question of a revision of the company's franchise the fear was expressed that if the company were assured that rates of fare would be put into effect that would provide earnings sufficient to meet all requirements it would not exercise care and economy in operation, but assured of its own return, would spend money freely on the theory that the car rider had to pay it anyhow, so why worry?

It was pointed out that the very complete control exercised by the city would act as an approval or disapproval of every expenditure. While this in a measure allayed the fears of many who still retain the suspicion of public utilities that years of the old régime of mutual hostility and distrust engendered, there were others who saw that a better way than to penalize laxity and inefficiency was to put a premium on efficiency and the result was a shining spot in the Cincinnati ordinance providing that, instead of a mere return sufficient to pay operating expenses, taxes

and fixed charges, the company can participate in the surplus over this amount depending upon its ability to operate efficiently and its exercise of this ability. If the rate of fare can be kept at 6 cents the company will receive 20 per cent of the surplus instead of having it all go to the reserve fund to reduce fares. If the rate is 5½ cents the company's share is 30 per cent, and if 5 cents the company's share is 45 per cent. If our friends who are predicting a general 10-cent rate all over the country are correct there is not much hope that the company's participation will be more than a moot question, but the principle is there and in new settlements made it should be embodied in a more workable and certain form. The idea of making the participation inversely proportionate to the rate of fare appears reasonable, but there should be some participation no matter what rate may be in effect.

The Results Summarized

The Cincinnati plan has now been in effect just one year. What are the results?

The initial rate of fare under which the plan started was 5 cents cash, no reduced rate for tickets. It was known that this rate would be insufficient, and the advance Jan. 1, 1919, to 5½ cents; April 1 to 6 cents; July 1 to 6½ cents and now Oct. 1 to 7 cents, have but carried out the company's prediction when the ordinance was passed that on the basis of expenses then the fare should be 6 cents, while if there were further increases in operating expenses that rate would not be sufficient. The further increases did come, notably, in the award of the War Labor Board increasing trainmen's wages.

The people of Cincinnati have thoroughly understood the reason for these advances. It is apparent that they want good service and are willing to pay what good service, as they themselves can readily see, in these days of high prices must cost. There have been here and there some expressions that if the company would pay no rentals and no interest on bonds or other securities the fare would not go so high, but the company has been frank and explained the situation quite fully in the newspapers and otherwise, and the people see the necessity of maintaining the company's credit in order that it may get the money with which to make improvements. Furthermore, when they have realized that the company's own stockholders have not as yet participated in the working of the new plan and that the greatest beneficiaries have been the employees who have received higher wages and they themselves who have received improved service, they have awakened to the fact that while they are paying more for everything that they buy the increase in car fare is one of the smallest and, under the service-at-cost plan, the most logical and scientifically made.

The 7-cent fare now in effect is expected to produce just about enough to provide the current requirements. There is, however, a deficit resulting from the operation during the past twelve months at a lower rate, and theoretically this deficit will have to be met also out of earnings. The problem now is to wipe out this deficit without its remaining as a cause of further increasing fares.

The experience in Cincinnati points out the advisability of avoiding the creation of a deficit at the beginning of the working of the service-at-cost plan if possible.

The experience of Cincinnati from higher fares has been encouraging to those who believe that the public is becoming educated to the necessity of higher fares in order to preserve and improve street railroad facilities. During the month of August with a 6½-cent ticket and 7-cent cash rate in effect the ticket fares were 69.54 per cent and the cash fares 30.46 per cent of the total adult revenue passengers, so that instead of an increase in rate of 30 per cent the increase in rate was 33.04 per cent. The number of revenue passengers carried increased 2.04 per cent over the same period of 1918, which is under the normal increase in Cincinnati, but still an increase in spite of the higher fare. The result was an increase in passenger revenue of 34.67 per cent. It is believed that this result is due to the general understanding of the people of Cincinnati that they now actually control the operation of the street railroad system and that, as the company has explained as clearly as possible, they can have just the kind of service they are willing to pay for; and also to the appreciation by the people of the fact that even with general operating conditions in Cincinnati much more costly than most other cities on account of extreme grades and narrow streets, the fare under the service-at-cost plan is under that in many cities where the increase in fare has been made arbitrarily, or at least on a less scientific basis.

A tangible result of the enactment of the revision ordinance in Cincinnati has been the appreciation by the bankers of Cincinnati of the stronger position in which the company is placed thereby. The requirements for money during the time that the company has been going through the period of low fares under the new plan, as well as money for improvements, has been urgent; and the bankers, recognizing the necessity to the community of continued adequate and improved street railroad service, have provided the funds to keep the company in a position to function properly. The next decisive step under the ordinance will be working out the future financing of the company. It is confidently believed that the new plan will pass this test also, and if it does it will be a vindication of the optimistic opinion sometimes expressed that when the people of a community are given the facts and their aid enlisted in working out a problem along lines that are fair to them, they will not only thoroughly understand and appreciate the problem, but aid in its solution.

Merits of Service-at-Cost Plan

I cannot refrain in closing to call attention to one possibility under the service-at-cost plan in Cincinnati, or in any other city where it may be adopted, and that is, the solution of the transportation problem by whatever advancement of the art or by whatever replacement of existing methods by radically different ones may be attempted. One question asked of street railway operators at the early hearings before the Federal Electric Railways Commission was, if they believed that existing street railways should be protected not only against the evident and accepted unfairness of unregulated jitney competition, but against any new method of transportation that by its inherent efficiency or cheapness would put the street railroad out of business. It now appears improbable that the street car on city streets can be superseded by anything more efficient because of the necessity for as large a unit as possible moving in the smallest space and by the most economic power; but even supposing that enormous motor buses of some type could be devised, which would eliminate the impossible congestion that would result from turning passenger carrying business over to any existing form of gasoline vehicle and which could be operated more cheaply and carry passengers more comfortably, the street railway interests could not successfully oppose the development of a carrier of this sort. No industry can stand long in the path of progress. But if such a new development should come what agency could more logically and efficiently operate the new system than the existing transportation company under city control?

The Cincinnati service-at-cost plan not only provides for the amortization of a considerable amount of existing securities but contemplates the amortization of future security issues. The impossibility of a top-heavy capitalization, therefore, is apparent and any new transportation method,

either in the way of motive power, type of vehicle or place of operation, could be undertaken by the existing system through the issuance of securities under the direction and approval of the municipality, where it could be shown that the new system would be more efficient or more economical or more desirable for the traveling public even at an increased cost. In all fairness the present worth of the existing transportation system as found and fixed by the municipality ought not to be ruthlessly dissipated; and if a more efficient plan is devised the old one should be amortized and the new one put into operation, through the medium of the existing company acting directly under the control of the municipality, thus protecting the honest investment as ascertained by the municipality when the service-at-cost plan is adopted and at the same time giving the public the benefit of the best there is in urban transportation.

This would remove the possibility of antagonism to new methods that might be evidenced by an independent and uncontrolled street railroad system and insure the adoption of the most modern means of urban transportation that might be developed and its operation by an efficient and experienced organization.

The Youngstown Service-at-Cost Franchise*

Many Difficult Features, Commonly Called "Local Conditions," Affecting Operation in Youngstown Have Been Satisfactorily Solved—Four Alternatives Are Suggested

By R. P. Stevens

President Mahoning & Shenango Railway & Light Company, Youngstown, Ohio

FREQUENTLY, when the subject is broached of replacing the form of grant under which street railways customarily have been operated in all sections of the country since the infancy of the industry with what has come to be known generally as a "service-at-cost" franchise, objection is raised that the plan is not feasible here, there or elsewhere because of complicated local conditions. Our experience in Youngstown in turning from the older form of franchise of limited duration, with fixed rate of fare and ill-defined, irresponsible regulation of service, to the newer and, as many think, better plan of operation is demonstrating that this objection is not insurmountable. The Youngstown service-at-cost franchise was modeled largely after the so-called Tayler grant, though it departs from that model in some particulars, but the complications to be untangled before the city railways could be set up as a distinct property capable of operation under the service-at-cost plan, were many and difficult.

The lines to be included within the city property represented approximately one-third of the entire system (59 out of a total of 178 miles) held in common ownership, lying within four counties in two states, giving city service to four communities and tied together by three main lines of interurban railway. In many years there had been no distinct line of demarcation between the three interurban lines entering Youngstown and the local lines serving the various parts of that city and immediately adjoining villages. Due to common ownership and operation, the interurban cars had carried local passengers promiscuously. Here, then, primarily a sharp division must be made, so that city traffic proper might come under the new plan, interurban traffic be made distinct from it, and at the same time both types of service be adequately maintained.

A further complication was that several of the largest industrial plants lay just outside the city limits in other cities. They were most important traffic points to citizens of Youngstown and, therefore, their inclusion within the city system became both necessary and desirable. These lines extended into three other cities adjacent to Youngstown and were operated under franchises requiring a 5-cent fare to any point in Youngstown. At first this seemed almost insurmountable but was overcome very readily by obtaining new franchises in each city. In the two small cities lying east of and immediately adjacent to Youngstown, the new franchises provide that the fare shall be the same as that charged in Youngstown under the service-at-cost franchise, but in the city of Girard, to the west, the new franchise provides that the fare shall be 1 cent greater than the fare at any time charged in Youngstown.

Another situation in this same connection that had to be met was that our working agreement with our car-service employees, divided into six locals, was entered into in common through negotiations with a joint board. One of the interurban divisions was worked entirely and another to the extent of 50 per cent by Youngstown crews, and the extra list used in common with the Youngstown city lines. Here not only physical but labor conditions called for a solution.

Again, the central carhouse and car shops, where virtually all the major repairs to cars for the entire system had been made for a period of years, must be included as an essential part of the city property, yet work on cars from other parts of the system must be done there, at least for a time, as a matter of proper economy.

How These Complications Were Overcome

Permit me to outline the manner in which these conditions were met before mentioning others of a still more complicated character. First, it was decided that the service to the large industrial plants lying beyond the city limits must be included within the territory of the proposed city system. This supplied the line of demarcation for the city district, differing somewhat from the lines of the municipality. It also decided where the interurban lines extending respectively east and west from the city ended. All traffic within these points was to be local traffic and no local traffic was to be carried on interurban cars; but provision was included in the franchise for the right to continue the operation of the interurban cars over the city tracks to the center of the city.

The situation as regards the third interurban line involved presented a different aspect and was not so simple, as this line was covered by the existing franchise which was about to be given up. About 3 miles of this 15-mile line lay within the city limits, much of it on private right-of-way. No distinct city service had ever been rendered over it, though it carried local passengers. It was chiefly the entrance to the city for traffic arising without the city. To turn one-fifth of the line over to the city system in these circumstances would be simply to bite the interurban line off short, possibly seriously to interfere with the preponderant right of the outside traffic to enter the city.

Therefore, none of this line was included within the city property, but it was provided that the rate of fare charged within the city on this line should always be the same as on the city lines and, further, that the city should have the right at any time to inaugurate city service under the control of the railway commissioner over the part of the line within the city the same as on the lines embraced within the city system, and that the compensation for this privilege to be paid by the city system should be the same as that paid by the other interurban lines mentioned for the use of the tracks of the city system.

These arrangements disposed of the division of the tracks and overhead. As stated, it was necessary to include the chief car shops of the company in the city system and yet provide there for heavy repairs to outside equipment. This was done by the inclusion in the ordinance of a clause providing for the right to make such repairs as might be

* Abstract of paper presented at meeting of American Electric Railway Association, Atlantic City, N. J., Oct. 8, 1919.

necessary upon the payment of the shop costs and proportion of overhead.

The ordinance provided for the complete corporate autonomy of the company, thus giving the company full control over matters relating to employees. Therefore, the question of operating interurban cars from the same regular and extra lists of men operating the Youngstown cars could not be specifically treated in the franchise, but it was the plain intent of the plan that the city and interurban lines should be entirely separate and the complications that might arise, especially at times of labor shortage, over a question of preference in manning local or interurban runs may readily be imagined. Therefore, it was necessary to withdraw, as soon as practicable after the ordinance became effective, the freight and passenger interurban runs that had been filled with Youngstown crews and place them elsewhere.

This was done by gradually filling these runs from the other ends of the divisions affected, a simple enough proceeding were it not for the dissatisfaction that such a proceeding might cause among the car service men.

The Power Situation Was Complicated Also

Aside from these distinctly railway matters we had other obstacles to meet and overcome. We had a combined railway and light and power property. The current for both railway and lighting and power purposes was generated at three power stations, one within the city and two outside. The station in the city of Youngstown was used for both railway and lighting purposes, while part of the railway power used within the city was generated at a station some miles outside the city, the two being tied together by transmission lines. In addition, exhaust steam and some live steam from the station in the city was used for our central station steam heating system. The chief substation for the city's street lighting system and for domestic purposes was located in the city power station. The commercial direct current circuits for elevators and the like were fed from the same machines as were the trolley feeder circuits.

We must untangle this complication and in order that the city railways might be a complete property in themselves, provide for them a power house of their own. This was one of the knottiest problems presenting itself in the negotiations between the city and the company. It was solved by including the Youngstown power station as part of the city railway property, excepting the lighting substation; the strict division of the source of power for the various uses mentioned; provision for the mutual exchange of power between the two power stations directly affected as occasion might arise; and provision, first, for the right of the company to continue to use steam from the power station boilers for central station heating purposes, and, second, the manner of payment for such steam. Proper metering arrangements made such a plan possible without serious dislocation of any of the businesses involved.

A New Company Organization Was Preferable

The organization of a separate company immediately to own the franchise and to have full control of the property either through ownership or lease was not practicable in Youngstown, because of the most serious complication of all that confronted us, the mortgages on the property as a whole. These would not permit of a subdivision of the property or a relinquishment of the old franchise unless a new one was substituted. The advisors of the city authorities were firm believers in the potency of a separate company with a large proportion of local shareholders as the best means of assuring the continued and certain success of the plan. The experience in Cleveland had led them to that conclusion. Accordingly, the franchise which was framed looked to such a consummation in Youngstown.

But the funded debt of the company owning and operating the facilities from which were to be carved a complete city system was chiefly in the form of a blanket mortgage covering railway, light and power, steam and gas properties, irrespective of municipal lines or limits. This mortgage still had some time to run. It did not contemplate the segregation of the property into various local units. Yet the piece of this property that must be set aside for separate operation and eventual ownership, must be a complete railway property in itself.

The setting up of a district operating organization, the opening of new sets of accounts and similar steps for the separate handling of the city railways under the service-at-cost plan, were comparatively simple and were carried out coincident with the taking effect of the new franchise, but the setting aside of the property, in a financial sense, was something quite different and could not be accomplished so speedily or easily. Still it was one of the definite objects of the new pact.

The difficulties caused by the mortgage conditions were met in this way: The city naturally desired a separate company in fact as well as in name; it wanted to deal with a corporation that had no interest save that covered by this service-at-cost compact, and there was no reason why this desire should not be satisfied, provided sufficient time were granted to make the necessary rearrangements of the funded debt.

This was done in connection with the provision for the purchase of the railway property by the municipality at any time it might elect by placing a premium on the value of the property if a separate and distinct company were organized and limiting the time within which this separate organization must be set up. The provision is as follows:

"* * * In the event the city shall purchase and take over the street railway property of the company covered by this ordinance during the life of this grant or any renewal thereof, as in this section provided, then it shall pay for the same the capital value of said property, increased or diminished, as in this ordinance provided, and in the event that the company shall cause within forty-eight months from the date this ordinance goes into effect, a corporation to be formed under the laws of the State of Ohio for the purpose of owning and operating all of the lines and property covered by this ordinance and all additions, betterments, extensions and improvements added thereto, and said corporation shall actually take over, so own and operate aforesaid property and the total issued and outstanding capital stock and all bonded and floating indebtedness by it incurred or assumed, shall, at such time of taking over, be equal to the whole capital value as it may then be under the terms of this ordinance and no more, and shall thereafter whenever it becomes necessary to sell stock of such company to secure money for any purpose herein provided which requires the par value of such stock so sold or expense thereon to be added to the capital value, give all reasonable and fair opportunity to the citizens of the city of Youngstown to buy said stock at its par value, then a further sum equal to 10 per cent of the capital value so appearing at such time of purchase shall be paid by the city. * * *"

The start on the organization of the new company called for by the ordinance was made immediately after the franchise became effective. The company was chartered and organized with a nominal capital; the organization set aside by the parent company to operate the city property became the operating organization of the new company, with the only points of contact between the two resting in the president, treasurer and general manager, and the way was cleared for the financial reorganization necessary to meet in full the city's requirements with what seems an ample period ahead, even in these times, to accomplish that purpose.

Differences Between the Cleveland and Youngstown Plans

The objects of the Youngstown plan are identical with those of all similar plans, as follows:

1. Adequate service for the people of the community, assured through the supervision of the service by a commissioner appointed by the city.

2. Adequate revenue to pay for this service, assured through a sliding scale of rates of fare automatically changing in accordance with the needs of the service.

3. Fair return upon the money invested in the property, assured through basic and definite means of ascertaining that investment and the rate of return to be paid thereon, and made a part of operating expense.

Naturally in every community there will be minor differences in the manner of applying these broad principles of the plan. Such was the case in Youngstown, especially as compared with the Cleveland plan after which it was modeled.

For instance, the capital stock and bonds outstanding against the property at the time of the ordinance taking effect has no bearing on the value on which a return shall be paid. The property to be included within the city system was specifically enumerated and set forth in the ordinance and upon this an agreed valuation was placed. This valuation is permanent; upon it the return is paid. As extensions or improvements are made, or as existing property is sold, the value upon which the return is paid fluctuates.

Again, there is a difference in the rate of return. For the property originally included in the system, this is fixed and invariable—7 per cent per annum. Upon capital additions from time to time it is provided that the return shall not be at this rate, but at the rate actually required to obtain money at the time. This entirely eliminates the necessity of the company taking any chance on the cost of money in the future and avoids just such controversies as that now existing in Cleveland over the rate of return to the stockholders.

Another difference, and an important one, is the fact that there is neither a minimum nor a maximum limit set to the rate of fare. A range of nine rates of fare is set forth in the ordinance and it is further provided that in event of the next to the last rate set forth in either direction becoming effective, the Council shall establish another rate in the same ratio as the rates set forth in the ordinance so that always there are two more steps in the sliding scale of rates ahead of the rate in effect.

The rates are for both cash and ticket fares. The provision for transfers is that they shall always be charged for at one cent each, regardless of what the cash fare may be. In this particular there is some difference from the Cleveland plan where at times the refunding of the charge for transfers provides essentially free transfers.

Another rate provision of interest is that the city and the company may at any time agree on any fare, regardless of the prescribed order in the schedule, thus permitting of the prompt meeting of an extraordinary situation. This is a valuable asset to the company.

Other differences have been touched upon in detailing the steps that were necessary in segregating the property, while there may be some in connection with the provisions for arbitration and the right of the municipality to purchase the property, but the details of these would require too lengthy a discussion to permit of their treatment in this short paper. Suffice it to say that the machinery for arbitration and the subjects that may or may not be arbitrated are set forth at length. The city's right to purchase may be exercised at any time during the life of the grant or any extension thereof upon six months written notice, or at the termination of the grant. In the latter event the 10 per cent premium referred to before is not to be paid for the property.

At any time the grant, or any extension thereof, has less than fifteen years to run, the company has sole control of the matter of making extensions or betterments and has the right to set up an amortization fund during the balance of the life of the grant for the entire value of the property. This is an important safeguard, as it practically means a perpetual franchise unless the city elects to buy the property, and the company is not left hanging in mid-air with a large investment and no way of recovering it at the expiration of the grant.

Results at Youngstown Have Been Encouraging

So far as our experience has run in the period of eight months that the service-at-cost plan has been in effect, there is no great difficulty in operating under its provisions. Indeed, there have been distinct advantages and comparatively few disadvantages. To be sure we must remember that public officials of a city are frequently better politicians than they are business men and that realization of the identity of interests of the company and the city—the essential fact of a partnership existing—is arrived at somewhat slowly. At times there is apt to be a reversion to the age-old habit of "heckling" the street railway as a means of impressing one's constituency, especially in times like the present when costs and, therefore, fares continue upward in their movement.

In Youngstown there was an immediate and definite improvement in the service possible, because, with the beginning of operation under the plan, the means were provided, or assured, to pay for it. At first there were many complaints made by persons impatient for revolutionary improvements, and considerable agitation for all sorts of extensions of lines, but this ebullition simmered down till now there is wider and more general satisfaction with the service than at any time in the last two years or more, and this in face of a steadily advancing rate of fare.

Thus, the company has been relieved of a great deal of bickering and fault-finding and, moreover, the necessary advances in the rate of fare have been put into effect without the slightest friction. Indeed, a number of citizens have shown their appreciation of this fact to the extent of constituting themselves unofficial inspectors and checkers, always with good intentions but not always with as good results.

Some Suggestions Are Made Regarding Future Service-at-Cost Franchises

In closing permit me to make a few observations which may be helpful in the negotiation of service-at-cost franchises elsewhere.

In our franchise the paving provisions are the same as in the old franchise. The street railway and, therefore, of course, the car-rider is required to pay for new pavement between the rails and 1 ft. on either side, to pay for repaving and to pay for maintenance of this paving. This is not fair to the car-rider.

I am also of the opinion that perhaps a better provision than that in our franchise with regard to transfers may be drafted. The placing of a monetary value on the transfer (excepting possibly under a few conditions) is correct in principle. It is, in a sense, the application of the zone principle where a true zone system of fares might not be practicable or desirable. But if the cash and ticket fares are to vary, why should not the cost of a transfer vary in like manner? My suggestion is that an intermediate rate for transfers be interposed between the steps in the cash fare rates as the higher figures are reached, so that a 2 or 3-cent charge for a transfer might be provided and thus the relation between the cost of carrying passengers on one line and on two lines be maintained.

But most important of all is the rate of return. I do not believe that any existing provision on this subject is entirely satisfactory. Here, perhaps, there should be a "sliding scale" also, so that business acumen and managerial efficiency might be spurred to greater effort by the incentive of increased reward. To be sure, a fixed, assured return, approximating to a degree a guaranty, has excellent features. It places the securities of the company operating

under such a plan upon a solid foundation and makes them very desirable for conservative investment and for trust funds and gives to capital stock something of the virtues of a bond.

Human endeavor is brought to its best under a system of reward and penalities and this is no less true of the management and operation of street railways than of any other enterprise. It has been suggested that, as the rate of fare is lowered through efficient management, the rate of return to the investors represented by that management be increased and vice versa, the rate of return probably fluctuating between a fixed minimum and maximum; but we all know that in the present era of ascending costs such a system would work a decided hardship. The increased costs have been beyond managerial control and to penalize the invested capital as a result would not be just. Moreover, the cost of money has advanced in much the same way as have the costs of material and of labor, so that, in the present circumstances at least, the plan for a lower return as fares increased would be departing from rather than meeting the course of the money market, a market just as important to us as those wherein we buy our supplies and our labor.

Again, we must remember that the interests of the company and the city officials in such circumstances might not always be identical. Ordinarly, we might expect both to work with the aim of reducing fares to the lowest feasible level, but the people of a community might well be willing to pay 6, 7 or 8 cents for a ride, or whatever other rate might become customary. Then, if skillful management and earnest application to reducing costs were to bring about a situation wherein a lower fare might be put into effect and an increased return earned, the people, through their representatives, the railway commissioner and councilmen, might elect, rather than to reduce the fare, to make an unprofitable extension of the lines, thus defeating the effort of the management to earn a reward by diligence and efficient work.

Sharing of Surplus Profits Not Vital to The Plan

Whatever else may be said of the service-at-cost plan, this matter of the sharing of surplus profits, of an increasing and decreasing return to the management of the lines, remains an open question, and if it could be solved satisfactorily would put the service-at-cost plan beyond question, but this feature is not at all vital to the adoption of the present plan as the most practical and equitable solution of the street railway problem yet offered.

I emphatically differ with those making recent public statements attempting to give the impression that service-at-cost plans are all failures, and feel that the claim is hastily born of ignorance of the facts and is very ill-advised.

In my opinion there is not a city street railway in the United States that can survive on a 5-cent fare alone, pay all its proper charges and properly finance itself to keep pace with the community it serves, and still the impression has been erroneously heralded broadcast that a 5-cent fare is sufficient in some cities and should be in all, greatly damaging the case of the universal pleading for a just return on money honestly expended. My conviction is that the ultimate solution of our problem rests in efficiency, honesty and a 10-cent fare. Investigations have proved that increased fare within reasonable limits will, if properly applied, produce increased gross and I fail to see why, if proper measures are taken, we cannot get 10 cents for ten cents' worth of merchandise. The bread man, the milk man and the popcorn man have taught us that a dime is only worth a nickel and is just as easy to get as a nickel used to be, so why should we wait until our properties are further dissipated?

The choices, therefore, that I have to offer are a 10-cent fare, municipal ownership, service-at-cost, or dissipation of your property and, as a result, stagnation of the community it should serve.

Montreal Cost-of-Service Plan*

Essential Features of a Contract Negotiated by the Company and a Commission of Five Representative Business Men Authorized by the Provincial Legislature

By J. E. Hutcheson
General Manager Montreal Tramways

In 1916 the Montreal Tramways possessed on the Island of Montreal, under its name or under the names of the companies absorbed by it, franchises in thirty municipalities; twenty-seven of which were exclusive; twenty-three, terminable between the years 1922 and 1961, and seven, interminable. The contract with the city of Montreal as it existed in 1892 was of thirty years duration, expiring in 1922. The company's system was operating under fourteen municipal councils.

The consideration for the use of the streets in the city of Montreal was an annual payment on the basis of a percentage of the gross earnings which applied only to the revenue from operation within the city limits as they existed in 1892. The tariffs, with free transfers, in each municipality were fixed for the duration of the respective contracts. In 1916 the average fare per revenue passenger on the entire system was 4.12 cents, and for total passengers 3.04 cents.

From time to time, during several years prior to 1917, the city requested the company to make extensions of tracks in municipalities which had been annexed. While admitting that in certain sections there was need of further service the company maintained that the city of Montreal could order extensions beyond the contract requirements in the areas annexed only by making a new contract covering such annexed areas.

This led to negotiations between the city and the company. No progress was made until the Provincial Legislature, in 1917, passed an act creating a commission of five prominent citizens of Montreal to prepare a contract that would safeguard the interest of the citizens and the shareholders of the company; such contract to become law when signed by the members of the commission and the company, and ratified by the Legislature.

After thoroughly studying the matter the commission unanimously concluded that a form of service-at-cost plan was the only equitable basis upon which a street railway franchise should be made. The company agreed to negotiate on this basis, and finally on Jan. 28, 1918, a contract, for a period of thirty-five years, covering the company's entire system was signed by the officials of the company and the commission. This was ratified by the Provincial Legislature on Feb. 9, 1918.

The new contract provides for the "Montreal Tramways Commission," consisting of three members appointed by the Lieutenant-Governor in Council, to serve for ten years. This commission has control of the service—may fix the speed of cars; may establish routes, stopping and transfer points; may fix passenger density per car-mile; may stipulate types of rolling stock and of track construction; must approve of all renewals and extraordinary maintenance expenditures, and is empowered to examine and audit all receipts and disbursements. The necessary expenses incurred by the commission in the performance of its duties are to be paid by the company and form part of the operating expenses.

Any party in the case may appeal to the Quebec Public Utilities Commission from any decision of the commission

* Abstract of paper presented by title at meeting of American Electric Railway Association, Atlantic City, N. J., Oct. 9, 1919.

on any question of law or jurisdiction relative to the contract, as well as from any decision rendered by the commission relative to the provisions of the contract. Such appeal shall be final, except on questions of law.

The act provided that the Montreal Commission should make the tariffs uniform for the territory comprising the city and the five municipalities within the city limits; such territory to be known as the "uniform tariff territory." Outside this territory the commission may fix different rates providing that these do not unjustly burden the rest of the system, and providing further that the municipalities outside the territory may, with the consent of the commission, agree to pay the company any part of the excess of their respective services for the purpose of obtaining lower rates.

GUARANTEE FUND IS PROVIDED

The company by yearly installments of not less than $100,000 is to provide out of its own resources a special fund of $500,000 to be known as the "guarantee fund," to be used to meet all liabilities and other debts (except mortgage debts) incurred by the company, prior to the coming into force of the contract, through the operation of its system, and to provide for the payment in each year of any portion of excess expenditure as hereinafter defined, which shall be found by the commission to have been unnecessary for the payment of penalties imposed upon the company, and also to guarantee fulfillment by the company of all obligations assumed by it. This fund when created is to be maintained by the company at $500,000.

The gross revenues of the company are to be disposed of for the following purposes and in the following order: (1) Operating expenses and taxes and operating profit; (2) Maintenance and renewals fund; (3) Return on capital value; (4) City rentals; (5) Contingent reserve fund; (6) Division of surplus.

The commission for the first year of operation is to allow the company out of gross revenues a sum for each revenue car-mile, under certain specifications as an operating allowance. The company is so to increase the transportation service, under the direction of the commission, that the permissible average density of traffic per car-mile, during the first year of operation under this contract, shall not be excessive. Thereafter the commission is to redetermine and fix annually the amount of operating allowance and permissible average car-mile density, based upon the experience of the preceding year.

COMPANY IS ALLOWED AN OPERATING PROFIT

If at the end of any year the commission shall find that the company has kept within 2½ per cent of the operating allowance the company may take out of gross revenues a sum to be known as the "operating profit," which shall be equivalent to one eighth of 1 per cent on the total average capital value for that year. Any excess over the above expenditure is to be known as the "excess expenditure," which is to be taken from the gross revenues to an amount not exceeding one eighth of 1 per cent on the average capital value for such year, and the operating profit shall be reduced accordingly. And if the excess expenditure shall exceed this amount the company shall receive no operating profit, but shall pay such excess out of the guarantee fund, unless the company shall have been able to convince the commission that the excess expenditure was unavoidable. Then the commission is to permit the company to take out of gross revenues the additional amount required to cover such excess expenditures and also award the company the full amount of the operating profit less any part of such excess expenditures which may be found to have been unnecessary. If the unnecessary part exceeds the amount of the profit, the balance is to be paid by the company out of the guarantee fund.

For the purpose of maintenance, renewals, etc., a "maintenance allowance" per car-mile is to be placed in a "maintenance and renewals fund." The allowance is to be adjusted annually so as to maintain the fund at $500,000.

RETURN ON CAPITAL VALUE IS SET AT SIX PER CENT IN NORMAL TIMES

The capital value of the tramways system is fixed at $36,286,295, including all physical assets added to the system up to Dec. 31, 1917. As its usual return upon capital value so fixed, the company is to receive in quarterly payments out of gross revenues a sum equal to 6 per cent on such capital value. From time to time hereafter, as money is needed for betterments, additions to and extensions of plant, required by this contract or approved by the commission, such money, except to the extent that monies for such purposes are payable at the time from the maintenance and renewals fund, are to be supplied by the company, and the amounts so supplied and actually expended for such purposes under the supervision of the commission shall, plus net interest expenses during construction, be added to capital value, and the company is to receive out of gross revenues an annual return of 6 per cent on such amount.

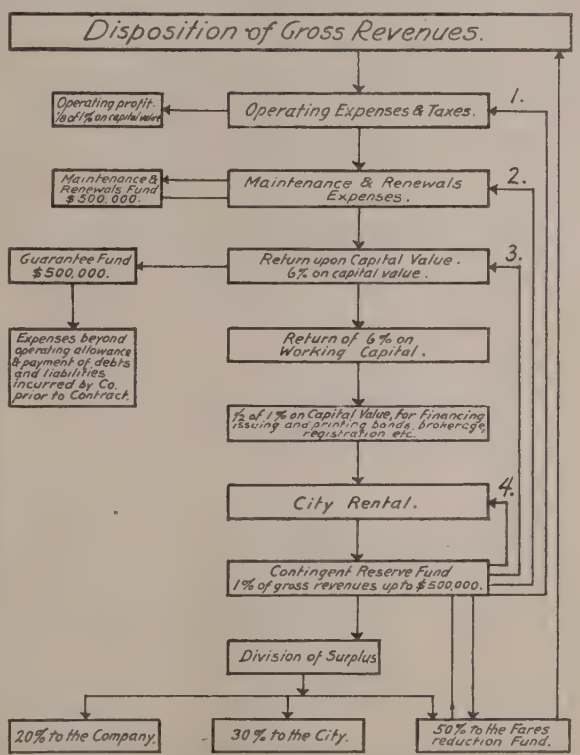
Disposition of Gross Revenues.
Operating profit. 1/8 of 1% on capital value.
Operating Expenses & Taxes.
1.
Maintenance & Renewals Fund $500,000.
Maintenance & Renewals Expenses.
2.
Guarantee Fund $500,000.
Return upon Capital Value. 6% on capital value.
3.
Expenses beyond operating allowance & payment of debts and liabilities incurred by Co. prior to Contract.
Return of 6% on Working Capital.
½ of 1% on Capital Value, for Financing issuing and printing bonds, brokerage registration etc.
City Rental.
4.
Contingent Reserve Fund 1% of gross revenues up to $500,000.
Division of Surplus
20% to the Company.
30% to the City.
50% to the Fares reduction Fund.

DIAGRAM SHOWING PRINCIPAL FEATURES OF MONTREAL COST-OF-SERVICE CONTRACT

As the capital established at the sum of $36,286,295 does not include any working capital, it is agreed that any working capital required shall be furnished by the company, and upon this working capital the company shall receive a return of 6 per cent.

For the purpose of covering the expense to be incurred by the company in procuring additional capital it shall out of gross revenues receive annually an amount equivalent to one-half of 1 per cent of $36,286,295, for discounts, commissions, printing and engraving, exchange, legal and other expenses incidental thereto when issuing bonds or debenture stock and for printing and engraving, transfer and registration fees and listing on stock exchange when issuing stock.

The city is to receive out of gross revenues, over and above all other amounts to which it may be entitled under the contract, or otherwise, the sum of $500,000 per annum payable quarterly.

OTHER FINANCIAL CONSIDERATIONS

One per cent of the gross revenues is to be paid annually into a contingent reserve fund, until this fund amounts to $500,000. This fund is to be used whenever it shall be necessary to make up any deficiency in the payments listed earlier in the order of priority therein established. Upon the termination of the contract, the company shall repay any monies borrowed from the fund and the total amount then in said fund shall be distributed as follows: to the city, 30 per cent; to the company, 20 per cent, and to a "tolls reduction fund," 50 per cent.

All the portion of the gross revenues remaining after the payment of the charges described is to constitute the divisible surplus, and is, at the end of each year, to be distributed as follows: to the city, 30 per cent; to the company, 20 per cent, and to the tolls reduction fund 50 per cent. The tolls reduction fund is to be held in trust for the patrons of the company for the reduction of tolls, and administered by the commission.

PROVISION FOR REDUCTION IN FARES

Whenever at the end of any year the amount in the tolls reduction fund exceeds $1,000,000 the commission may, and whenever the amount in said fund shall exceed $3,500,000 the commission shall, reduce the fares or tolls of the tramways system. For the purpose of effecting said reduction, an amount not exceeding 25 per cent of the total amount in such fund, at the close of the year preceding the year when such reduction is to be made, is to be taken out of the tolls reduction fund, and added to gross revenues, and the commission thereupon is to reduce the tolls to an extent that, in the aggregate for the year, is at least equal to the amount so taken out of the tolls reduction fund, but does not exceed such amount, plus 75 per cent of the amount which during the last preceding year flowed from gross revenues into the divisible surplus. Thereafter, at the beginning of each year, an amount shall be taken from the tolls reduction fund and turned into gross revenues equal to the amount so taken from said fund at the time of the reduction of tolls; but when the total amount remaining in said tolls reduction fund at the end of any year is less than the amount taken annually from such fund for the increase of gross revenues as above provided, the appropriation from said fund to gross revenues shall for the time being be discontinued, but the tolls shall remain as previously reduced until it shall be necessary as hereinafter provided to increase them.

If the tolls reduction fund, in spite of its depletion for such reduction in tolls, shall again increase to an amount in excess of $2,500,000, the tolls shall be further reduced.

If in any year the gross revenue shall be insufficient to provide for the payment of all sums mentioned, and if the contingent reserve fund is less than $300,000, the commission shall forthwith from any monies in the tolls reduction fund appropriate the amount necessary to bring the contingent reserve fund up to $500,000. If there is not sufficient money in the tolls reduction fund, the commission is forthwith to increase the tolls to the extent necessary to provide at least sufficient gross revenues to meet all the payments described earlier.

At the termination of the contract the tolls reduction fund is to be the property of the city.

THE APPLICATION OF THE CONTRACT PROVISIONS IN PRACTICE

In conformity with the provisions of the contract the Tramways Commission on June 24, 1918, set the rates of fares as follows:

1. From midnight to 5 a. m., 15 cents.
2. From 5 a. m. to midnight, 6 cents cash or five tickets for 25 cents.
3. For school children from five to sixteen years of age, on week days and between the hours of 8 a. m. and 6 p. m., seven tickets for 25 cents.
4. Transfers shall be issued free to school children specified above, and to all passengers traveling on cars between 5 a. m. and 8 a. m. on week days only. At all other times a transfer shall be issued to any passenger paying his or her regular fare at a charge of 1 cent.

The car-mile allowance for the first period of operation under the new contract was set as follows:

Operating expenses and taxes—22 cents per car-mile for cars equipped with motors, and 15 cents per car-mile for trailers.
Maintenance and renewals—7.9 cents per car-mile for cars equipped with motors, and 5.2 cents per car-mile for trailers.

This decision was appealed and the Quebec Public Utilities Commission rendered its decision on Sept. 20, 1918, fixing the rates as follows:

1. Day tariff, 6 cents cash or a ticket sold at the rate of five for 25 cents.
2. School children, a ticket to be sold at the rate of seven for 25 cents.
3. Special day tariff of a ticket to be sold at the rate of six for 25 cents, to be good only between the hours of 6 and 8 a. m., and 5 and 7 p. m. on week days only.
4. Night tariff, 15 cents cash.

Each passenger paying a fare shall be entitled to a transfer free of charge.

As the Quebec Public Utilities Commission did not fix any allowances per car-mile for the expenses of operation as provided for in the contract, the Tramways Commission on Oct. 2, 1918, fixed these as follows:

Operating expenses and taxes—20.1 cents per car-mile for cars equipped with motors, and 13.7 cents per car-mile for trailers.
Maintenance and renewals—7.33 cents per car-mile for cars equipped with motors, and 4.8 cents for trailers.

This gave an average allowance per car-mile for operating expenses and taxes of 19.93 cents and for maintenance and renewals of 7.26 cents.

The actual costs for the twelve months ending June 30, 1919, were, for operating expenses and taxes, 21.74 cents, and for maintenance and renewals, 7.26 cents. As the company justified before the commission the over expenditures made during the year, the actual cost per car-mile was allowed.

The company did not receive the full benefit of the increased rates of fare during the year, as they only became effective from Oct. 3, 1918. The average fare per revenue passenger increased from 4.1 cents to 4.8 cents after the new rates came into force.

For the year ending June 30, 1920, the Tramways Commision by its decision rendered on Aug. 29, 1919, fixed the rates of fare as follows:

1. Day tariff—from 5 a. m. to midnight 7 cents cash, or a ticket to be sold in series of four for 25 cents.
2. Special day tariff—ticket to be sold in series of five for 25 cents, to be good only between 6 and 8 a. m. and 5 and 7 p. m., on week days only.
3. The present outside night tariff and school children's tariff to remain in force.

The per-car-mile allowances are as follows:

Operating expenses and taxes—24.7 cents per car-mile for cars equipped with motors, and 17.4 cents per car-mile for trailers.
Maintenance and renewals—8.54 cents per car-mile for cars equipped with motors, and 7.05 cents per car-mile for trailers.

The above decision was appealed against by the city as being too high and by the company as being too low. Experts from the office of Bion J. Arnold, engaged by the city, were heard and they supported the company's figures. Arguments by counsel for both sides closed on Oct. 2, and judgment will be rendered in the near future, which I feel sure will not be more unfavorable to the company than to confirm the Tramways Commission decision of Aug. 29.

Gasoline vs. Electric Motor for Street Railway Service*

Electric Traction Will Profit Indirectly from Any Progress Made in the Direction of a Self-Propelled Vehicle But at Present the Gasoline Motor Cannot Compete with the Electric Motor as Railway Motive Power

BY NORMAN W. STORER

General Engineer Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

IN ITS commercial development, the gasoline motor has produced almost a revolution in modern civilization. In its far-reaching effects on the human race it ranks with the steam engine, the telegraph, the telephone, wireless telegraphy and electric transmission of energy. The war caused a great advance in the development of this motor, and in its accessories and application, resulting in high weight efficiency and improvement in service performance. A late estimate states that there were, on July 1, 6,353,233 registered motor vehicles in this country alone.

THE EXCELLENT GASOLINE MOTOR SHOULD NOT BE PUT TO WRONG USE

The use of the gasoline motor for motor-buses is on the increase, and there is now talk in some quarters of applying it to street railways. With all due respect to the promoters of this scheme, and to the gasoline engine itself, in the light of past experience I must rank this proposition with others of the past twenty years in which extravagant claims have been made for some new invention or for a new application of an old scheme before it had been thoroughly tried out. There is danger of ruining the reputation of a perfectly good piece of apparatus by applying it wrongly.

Two instances of the above occur to me. A few years ago a new type of storage battery was shown on the market under the name of one of the world's greatest inventors. All the art of the promoter was used in exploiting it. Its application to street cars was a foregone conclusion, since it would eliminate the overhead trolley and the feeder copper. For use with the battery a new type of car of extremely light weight was adopted as the only one suitable. The use of these light cars helped to show street railways how little power is actually needed to carry people, and how great had been the waste from the use of heavy cars. This type of car pointed the way to the light cars that are now coming into use so rapidly, but the cars did not furnish a wide field for the battery. This followed because the battery could not meet the requirements of the service. The railways have taken the light car, but have left the battery which had been pushed by unwise friends into service for which it was not fitted. We are all ready to admit the value of the battery for certain classes of work, but when it comes to competing with power supply from an overhead contact wire to the same type of motor on the same type of car in ordinary city service it has made very little headway. Its application to heavy locomotives, when it is possible to get power by overhead wire or third-rail, seems out of the question.

Another instance is in the use of the so-called frictionless bearing. In discussion before this association some years ago, I was one of several unable to agree with the enthusiastic friends of the ball bearing who were claiming for it virtues that would justify its immediate and widespread adoption on all electric railway equipment. Since that time the bearings have found a limited field in light equipment, but considerable development is still necessary before they will be acceptable for the larger cars.

In both of the above cases, the apparatus was and is of great value in certain classes of work, but the attempt to make a universal application has so far failed. In saying this, I do not wish in any way to cast aspersions on the great work that has been accomplished along the lines mentioned. On the contrary, I would be more than pleased to have the wildest predictions come true. Similarly, I would be greatly pleased if a gasoline motor could be produced that would meet the arduous requirements of street railway operation so successfully as to effect distinct savings in the total cost of service.

THERE ARE SEVERAL BASES FOR COMPARISON OF THE TWO MOTORS

It is necessary first, to consider the requirements for street railway service from a practical, common-sense standpoint and, as far as possible, the relative merits of electric and gasoline motors for meeting them. A motor for street car service should, first, have the right speed-torque characteristics to enable it to maintain the desired schedule. Second, it must be reliable; inherently able to withstand severe service and even abuse without breaking down on the road. The cost of repairing actual physical damage caused by a breakdown is usually insignificant compared with that entailed by delay and by interference with other cars.

If a motor can meet these two requirements it then becomes a question of relative cost, including first cost, maintenance, depreciation, and power cost. Frankly, I believe that the electric motor is almost ideally suited for street railway service, from the above standpoint.

Now, how about the gasoline motor?

GASOLINE MOTOR IS WEAK ON ACCELERATION

Of course, the gasoline motor can be applied to street cars and can make them run, but the speed-torque characteristics are not at all well adapted for the work. One would not consider the simplest form of electric motor for a street car if it had to be used with a friction clutch and a transmission that required the power to be cut off entirely in changing speed.

What would one think of a motor that had to be kept running with power on continually and that absorbed from 25 to 30 per cent of its normal power when running idle? This is the case with the gasoline motor, only that the conditions are probably worse. It has no starting torque and very little torque at low speed. It must reach a considerable speed before enough torque can be exerted to start the car, and then it must lose all the excess power in the friction clutch and gears. Of course, the several gear ratios help to balance this weakness, but at the best the gasoline motor would give a very poor acceleration for a street car unless the car was very much over-motored.

* Abstract of paper read at Atlantic City Convention of American Electric Railway Engineering Association, Atlantic City, N. J., Oct. 9, 1919.

At this point some one will say that his automobile will accelerate faster than a street car, but it must be remembered that the average automobile motor will develop 25 to 30 hp. per ton of load, while the electric street car has only about 7 hp. per ton of load. It is scarcely probable that it would be economical to apply gasoline motors large enough to give as good an acceleration as is easily possible with an electric motor with a single gear reduction. The poor acceleration together with the high friction loss during coasting periods would require the gasoline motor to develop a great deal more power than an electric motor on the same schedule.

Reliability Is an Inherent Virtue of the Electric Motor

On the score of reliability there can be no question regarding the motor that is operating in enormous numbers on our streets and roads every day, one that has operated continuously for from fifteen to twenty hours at high speed in driving an airplane across the Atlantic Ocean. We must admit that the gasoline motor is doing great work in automobile service, and the most marvelous feature about the ocean trip referred to is the fact that the motor was able to work uninterruptedly for so many hours. Now, no one would give a second thought to an electric motor that had operated continuously for twenty-four hours, as it is such a common occurrence. There is no reason why it should not operate continuously for months without a shutdown if necessary. This, in a measure, is a fair comparison between the gasoline and electric motors from the standpoint of reliability.

I do not imply that the electric motor is 100 per cent reliable, but it is vastly more reliable than a gasoline engine. This is true, not simply on account of the higher state of development but because reliability is inherent in the type of motor. Never in the history of the mechanic arts has there been such a concentration of technical skill and ability as has been applied to the gasoline engine.

While the gasoline engine is sufficiently reliable for use on automobiles and trucks, it remains that a degree of reliability reasonably satisfactory for these purposes, and even for motor-buses, would be entirely unsatisfactory on a street car. An independent vehicle can be held up for a few minutes almost anywhere without blocking the traffic, but a delay to a street car may hold up a dozen or more other street cars.

Gasoline and gasoline-electric cars have been used for years on branch lines of steam railways. Probably the most reliable form of such cars is the gasoline-electric car, which has the engine in the front end, where it drives the generator, the current being applied to standard electric railway motors. While a number of such cars have been placed in service, little has been heard of them for several years past and the number seems not to be increasing.

In one case in which I am familiar a car of this kind was applied on a line where there was apparently a real place for it. It was, however, taken out after a few months of operation, the chief reason being the unreliability of the gasoline motor and the accessories. The electrical apparatus gave entire satisfaction, and I believe the car is now operating on another line where the traffic is dense and reliability is of less importance.

The Electric Motor Excels in Low Maintenance Cost

Assuming now for the sake of argument that the gasoline motor can perform the same service with equal satisfaction and reliability as the electric motor, how do the two compare in cost? As to first cost, the advantage will lie with the gasoline motor on lines where infrequent service is maintained, and where the cost of transmission and distribution form a relatively large part of the total cost of an electrical installation. It may even be possible, also, that a gasoline car would cost less than an electric car; but there are no reliable data on which to base estimates. However, it is not the first cost with which we are concerned in the case of the gasoline motor; it is the cost of maintenance, depreciation and power.

Road With Gasoline Cars Would Need Large Shops

The operating cost of automobiles and trucks is very high, and the mileage covered is insignificant compared with that required of an electric car. Hence, although the total cost of maintaining a good automobile or truck may seem to be reasonable, when it is not related in terms of cost per mile it is very disturbing. The cost of maintaining the transmission of motor-buses is extremely high, but there seems to be no way of avoiding it unless resort is made to the electric transmission system which adds considerably to the weight and cost of the equipment. It is probable that the street car system operated with gasoline motors would require at least four times the shop space and facilities that are needed for operation of a similar number of electric cars, and that the cost of maintenance would be in proportion.

Now, as to the repairs. It is to be noted first that the electrical equipment on the street car is accessible and relatively easy to maintain, while the reverse is true of the gasoline motor. It is probable that this condition can largely be overcome, but if this is done successfully the motor is going to be placed so that it will occupy space that ought to be available for passengers.

The electric motor in street car service is ordinarily good for at least twenty years of life; that of the gasoline motor is relatively short. It is said that the motor for the high-speed airplane is not expected to last longer than 150 to 200 hours of flight without a complete overhauling. Of course this is very arduous service, but the motor operating in the best service is scarcely good for more than five years, even with the very small mileage which it makes. The depreciation of the motor is undoubtedly several times as rapid as that of the electric motor.

Fifteen years experience with motor-buses in London has shown the life of the gasoline motor to be about five years. The relative depreciation of gasoline and electric equipment is shown by the fact that it is difficult to borrow money for a motor-bus company for a period longer than five years, while a street car line may borrow money for twenty years.

Gasoline Cost Will Be a Determining Factor

There is one feature of this comparison where it is possible to give rather definite estimates, namely, in the cost of power. An electric car with modern equipment will use from 100 to 150 watt-hours per ton-mile. An 8-ton car will thus take about 1 kw.-hr. per car-mile, costing from 1 cent to 2 cents, depending on the locality. The gasoline motor in the best automobile will average scarcely more than 20 ton-miles per gallon of gasoline in city service where the machine is required to make frequent stops or slowdowns. On this basis an 8-ton vehicle would run about $2\frac{1}{2}$ miles on a gallon of gasoline.

With gasoline costing 25 cents per gallon the cost of fuel will be 10 cents per mile for an 8-ton vehicle as compared with 1 cent or 2 cents for the corresponding electric vehicle. Even if the mileage per gallon were greatly increased it would scarcely be probable that it could reach 30 ton-miles per gallon, and even with that the cost of power would be about 7 cents per mile, or under the most favorable conditions three and one-half times as much as the cost of electricity. It must be remembered that the electric truck

competes very successfully with the gasoline truck when the radius of action is not too great, in spite of the handicap of carrying the battery.

If to the cost of electric power are added interest, and depreciation and maintenance cost for a distribution system, it will be found that a line having a car every five minutes for eighteen hours per day would average about 0.8 cent per car-mile. A car every half-hour would be six times as much, or 5 cents per hour, allowing the cost of the trolley construction to be $5,000 per mile.

In the foregoing nothing has been said of the auxiliary features that must be considered for a street car. The electric car has, of course, electric lights and heating; the air compressor is driven by a small electric motor, and fans are frequently installed in the cars operating also from the line current. How can these features be supplied when the motive power is a gasoline motor?

To secure electric light which is necessary in these days, a storage battery and a generator driven from the engine are essential. To secure heat for the car it will probably be necessary to have a stove heated either by coal or oil. There might in some cases be the possibility of utilizing heat from the engine, but in most cases it would be very difficult to apply this, about as difficult in fact as to utilize the heat of the starting rheostat on the electric car for heating the car. It is an uncertain element and can scarcely be considered at present. If air-brake service is to be applied to the car, as would probably be necessary with cars of larger size, a compressor, driven either from the large engine by a clutch or by a separate engine, would have to be provided. Thus the problem confronting the company which wishes to build gasoline-driven street cars to compete with electric cars is a large one.

An important feature which has not thus far been considered in connection with gasoline-driven street cars is the necessity which exists in many places of providing for multiple-unit operation of cars. It would seem to be impracticable to build multiple-unit street cars driven by gasoline engines.

It is probable that the effort of anyone who is undertaking to apply the gasoline motor to street cars will result in a considerable number of features that will be valuable entirely apart from the motor itself. If the effort is made it is certain that the experience gained with automobiles and trucks will be applied with good results to the construction of a street car. Possibly this will result in a very great improvement in the design of cars. Street railway men should welcome any features of this kind and should utilize them to the fullest possible extent.

Motor-buses are undoubtedly going to be increasingly used for handling city traffic, and especially for supplying suburban places where the traffic is not sufficient to pay for the construction of the railways. For such service, as well as for a great deal of heavy trucking, the gasoline motor will find a profitable field, but when it comes to the operation of cars on rails where power can be supplied from a trolley wire or third-rail there is no possibility of its competing with the electric motor.

The Preparation of Data in Connection with Rate Cases*

A Systematic Scheme Is Recommended for Tabulating the Accounting and Statistical Data Which Are Desirable in Rate Cases, and Suggested Forms Are Given

BY CLARENCE R. BITTING
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THE preparation of accounting and statistical data for rate cases and their presentation to public service commissions and the public are of unusual importance at this time, for practically all public utilities are so burdened by mounting costs of materials and labor that they must either receive higher rates or forego dividends to which the stockholders are entitled on their investment. The former is the fair alternative.

In a number of recent rate cases it has been contended that a public utility should take the "lean" years along with the "fat" years, and that the stockholders should stand part of the increased cost of operation, but a public utility has no "fat" years because as soon as it is earning more than a fair return someone brings action before the regulating commission to have the rates reduced. Obviously when rates are insufficient relief should be accorded to the utilities.

A company which is capitalized 50 per cent bonds and 50 per cent stock, all of which represents tangible property, would on a 7 per cent return earn two and one-third times its interest requirements, assuming 6 per cent interest on bonds. This would, of course, make a very salable security from a banking standpoint, but unfortunately very few companies are able, due to financial conditions, to finance their construction through the sale of stock. Of 234 companies tabulated by the writer, only fifty-seven have preferred stock. It will, therefore, be seen that practically 80 per cent of the companies are restricted to the sale of bonds for their financial requirements. A series of calculations which the writer has prepared establishes conclusively that a company receiving a return of 8 per cent can with safety finance capital expenditures through the sale of bonds, preferred stock and common stock; at all times paying a dividend of at least 6 per cent on the common stock and still retaining a portion of its earnings in surplus to meet unforeseen accidents, obsolescence and the superseding of property through improvements in the art.

NUMBERING AND TABULATION OF DATA

To begin with, a plan of numbering and indexing data and exhibits should be adopted. A plan which has been operated very successfully is based on the following main divisions:

1. Income statements by years.
2. Income statements by months.
3. Miscellaneous income statements.
4. Ways and structures.
5. Equipment.
6. Power.
7. Conducting transportation.
8. General and miscellaneous.
9. Taxes.
10. Depreciation.
11. Non-operating income.
12. Fixed charges.
13. Surplus.
14. Balance sheets.
15. Increases in wages and materials.
16. Comparisons with other companies.
17. Traffic and service statistics.
18. Estimates.
19. Investment and valuation data.

Each main account or classification should be prepared on a separate sheet or sheets of the size prescribed by the

* Abstract of paper presented at meeting of Accountants' Association, Atlantic City, N. J., Oct. 7, 1919.

commission before which the case will be heard. In this connection it might be well to state that where an exhibit of larger size must be presented it should be prepared on a size that is a multiple of the regulation size so that it can be readily folded to such regulation size.

An idea may be formed of the subdivisions of the various main divisions by quoting from sections of index to exhibits filed in a recent rate case.

INCOME STATEMENTS BY YEARS

1 —Chart of earnings by years.
1 A —Summary of statement by years.
1 A 1—Detail of revenue.
1 A 2—Detail of maintenance—ways and structures.
1 A 3—Detail of maintenance—equipment.
1 A 4—Detail of power.
1 A 5—Detail of conducting transportation.
1 A 6—Detail of traffic.
1 A 7—Detail of general and miscellaneous.
1 A 8—Detail of taxes.
1 A 9—Detail of fixed charges.
1 A 10—Detail of non-operating income.
1 A 11—Detail of surplus charges.
15 —Principal wage increases.
15 A —Chart showing periods affected by recent wage increases.
15 A 1—Chart showing hourly wage for platform employees.
15 B —Statement showing cost of materials, ways and structures.
15 B 4—Chart showing range of prices for rail (per ton).

For the use of a witness, it is well to have a cross-indexed copy of the exhibits for ready reference. For instance, under "4" should be filed all of the various exhibits dealing in any way with maintenance of ways and structures.

A very satisfactory method of binding consists of the use of press boards between each of the main divisions of the exhibits and any principal or special exhibits, all to be marked with thumb tabs and bound with metal binding posts.

The preparation of accounting data showing the capitalization and capital expenditures of the company is difficult. Practically all of our traction systems are the result of a series of reorganizations, purchases, consolidations and mergers and in many cases the books of the original companies have long since been lost or destroyed through accident.

In a valuation the engineer will present the cost to reproduce the property new and also the same figure less depreciation. His task is relatively easy compared with the task of the accountant in ascertaining the capital employed. However, I feel that no statement of the cost to reproduce the present property of the company should be made until a reconciliation has been prepared by the accountant. Of course this will not check with the actual figures shown on the engineer's report but will serve as a rough check on his report and also as an explanation of the capitalization of the company.

The best method of preparing such data is to make a statement showing the cost of the various underlying and predecessor companies, also the cost to the organizers of the present company. As a rule the engineer's report or correspondence showing the estimated value of the property at the time it was acquired is available, and this statement should be summarized and the difference between such estimated value of the property and cost of property to company should be made and this difference set up as a separate item.

Securities issued for promotion services and discounts on bonds issued at the time of organization should be shown as separate items, also the cost of superseded property, if available, should be shown. While some opponents of increased fares hold the view that possibly excessive prices were paid for the underlying companies, a careful reading of newspaper files for a few years preceding the date of the consolidation will, in most cases, show a growing demand on the part of the public for the elimination of the disagreeable features of competitive operation of the street railway system. The only method of eliminating these disagreeable features was the consolidation of the various lines then operating, and no man was compelled to sell his property for less than his price. The public demanded consolidation and should pay the cost of same.

The estimated average depreciation for the time the property was operated by the present company should also be shown as a deduction. This statement should check in round figures with the present cost to reproduce the property and would be an additional item of proof in establishing the fair present value of the property devoted to public service.

FORMS AND CHARTS RECOMMENDED

A series of suggested forms for compiling and presenting this information was then exhibited. They included the following:

A form covering the cost to the present operating company of the various predecessor and underlying companies, together with the cost of additions, betterments and extensions made by the present company.

A form reconciling the cost to reproduce the property, as shown by engineer's report or appraisal, and the book value of the property.

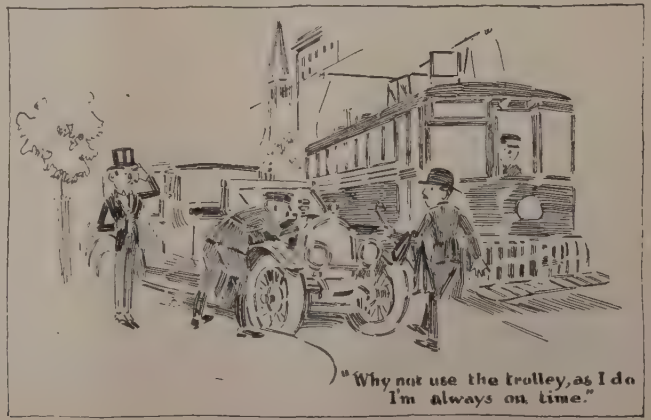
A form reconciling the cost to reproduce the property, less accrued depreciation, based on the same reports as used in the previous form. While this form shows accrued depreciation deducted from the cost to reproduce the property, the author explained that the statement was presented only because a number of regulating commissions use depreciated value for a basis of figuring fair return.

The fourth form was a condensed balance sheet, which should be supported by detail schedules for each item.

A fifth chart, prepared from the condensed balance sheet, showed the relation between the value of the physical property and other assets of the company with the capitalization and reserves.

The sixth statement gave operating statistics and the seventh, other statistics of interest, such as: growth in population, growth of company in miles of track operated, passengers carried per thousand of population, etc.

The author also recommended the use of graphic charts of which samples were presented.



Symposium on the One-Man Safety Car

Striking Testimonials of Operating Men, Manufacturers and Consulting Engineers on What the Frequent Service Car Has Accomplished and What May Be Expected of It in Reducing Costs and Increasing Revenues—The Standardization Feature of the Car also Weighed

Safety Car Scores a Success in Kansas City*

As a Jitney Eliminator the Car Takes Second Place Only to the Proper Kind of Ordinance—Exceptions to Standard Design

BY P. J. KEALY
President Kansas City Railways

ONE of the most distinguishing features of the American public is its impatience of delay. The average person wants a car at a corner at the time he arrives there. A wait of a few seconds and he begins to complain, and nowhere is a minute quite so long as one spent on a corner waiting for a street car. We recently had a case where the wife of a prominent citizen was transferred from a turned back car to another following. The first car was put on a wye to wait for the next one, and when her husband complained of the incident he emphatically stated that his wife had been made to wait on a side track in the hot sun twenty minutes. The matter was investigated and the traffic checks at four different points showed that the car for which she waited was two minutes behind the one she was on. At the most she actually waited not to exceed three minutes. An attempt was made to explain to the husband, and he declared the dispatchers were liars and that reflection had been cast upon the veracity of his wife. If she had said that instead of waiting twenty minutes it seemed like twenty minutes, she would have been more accurate. This illustrates the attitude of the average person when waiting for a car, and if while in that frame of mind, a jitney, no matter how overloaded, shows up, the street car company loses a fare. If the distance is not too great he walks and a short-haul passenger is gone.

Now it is manifestly impossible to run heavy double-truck units using from 3½ to 4 kw.-hr. per car-mile in charge of two 50 to 60 cents an hour men past this corner often enough to please this prospective customer. The chances are one car in every five to seven minutes will only carry enough passengers in the non-rush period to keep the crew from being lonesome. But this does not keep our friend from feeling that he should have 60-cents-a-car-mile service on a 20-cent line.

REDUCED HEADWAY MEANS BUSINESS INCREASE

The safety car solves the problem. Just about the time he is getting to the jitney or the walking frame of mind the safety picks him up, the company gets the fare, and the passenger is pleased. Unquestionably, reduced headway means a business increase, depending upon the circumstances surrounding the line and the traffic. Naturally the largest revenue increases reported are from smaller cities where riding is often a matter of convenience and not of necessity. On lines where the bulk of the traffic must ride, this increase will not be so marked except where jitney competition is encountered. And the jitney thrives upon long headways and infrequent service. As a jitney eliminator the safety car is second only to the proper kind of ordinance and sympathetic police regulation.

However, as a net revenue producer combining both the increase in gross and the decrease in expense, the safety car holds out inducements that no management today can afford to overlook. Any piece of equipment that will pay for itself in three years is a good buy, and a net revenue increase of from $1,700 to $2,000 per car per year can overcome a host of objections.

I am not one of those whose enthusiasm leads them to believe that the little car can be used wherever there are tracks. Like everything else, it has its limitations. On a line where a minute headway with the large units cannot handle the business, the safeties will not fit. We have one line in Kansas City which runs from 60 to 67 cents per car-mile. During the day it has practically no peak except for about twenty minutes in the afternoon. Using the safeties there would be about as wise as trying to pour a quart into a pint measure. On lines where the large unit headway is more than four minutes with receipts under 30 cents per car-mile, they can be used.

Their only limitations are traffic density and not operating. As far as the latter is concerned they can be run wherever there are tracks and power. We put them through the congested district in Kansas City over eight blocks where the headway is thirty seconds, and they maintain schedules like any other car. The Sunset Hill line, like all lines in Kansas City, has heavy grades, and an average speed of 11.27 m. p. h. is obtained over the larger part of the route. As a matter of fact, there is nothing new in the idea of one-man operation. We have never had anything else. The limitations of the safety car are not due to its method of operation but to the square feet of floor space passing a given point as compared to the number of people boarding the car at that point.

NINETY-FIVE SAFETY CARS IN KANSAS CITY

We have given the safety car a fairly good test in Kansas City and the results of five months operation justified an order for sixty-five which will give us ninety-five in all.

We received twenty-five in April intended for a number of outlying lines in different parts of the city. However, there had been so much discussion as to the advisability of their use on a typical city line running through the congested district in conjunction with the large units, that we decided to give safety car operation a thorough trial under such conditions and see where the bugs in them were.

The Sunset Hill line is 7 miles long. It runs for twelve blocks through the exclusive residence district, then for seventeen through a thickly built-up residence district of the better class, then for fifteen through semi-residence and business, and for twelve through the congested retail district of Kansas City. We had been running a four-minute headway during the afternoon rush and eight minutes during the non-rush.

Here are the results of five months safety car operation on this line:

First, to the public:

A maximum of twenty-five cars at present as against twenty; an afternoon rush headway of two and a half minutes as against four minutes; a non-rush headway of

* Abstract of paper presented at meeting of Transportation & Traffic Association, Atlantic City, N. J., Oct. 7, 1919.

six minutes as against eight, a 32 per cent increase in car-miles; a 51 per cent increase in car-hours. According to the statement of one man who formerly was a chronic kicker, it now looked during the evening rush hour as if there was a car in sight out his way all the time. A maximum crowding limit is set; when fifty passengers are on the car a "car full" sign is displayed and no more taken on.

Second, to the company:

An increase of $4,119 in gross revenue over the increase for the same period on the entire system; a saving for the five months period in power and wages alone of $12,916, or a total increase in net revenue directly due to the safety car of $17,035 for five months, or at the rate of $40,884 per year. The average cars on this line are less than twenty per day, making a net annual revenue gain of $2,000 per car. This is conservative as it does not take into account the decrease in car maintenance expense and includes all the car-house expense due to disabled cars, pull-ins, instruction, etc. Furthermore, there are very few jitneys on the line served by the safety cars.

Prior to the introduction of the safety car on this line the average number of stops per mile was seven, the average time per stop 7.7 seconds, the average number of passengers twenty-one. Safety-car operation gives the following results: Average schedule speed, excluding layover, 9.87 m. p. h.; average schedule speed, including layover, 8.97 m. p. h.; average equivalent stops per mile, 6.82; average duration per stop, 8.4 seconds; kilowatt-hour consumption per car-mile, 1.325; average passengers, 14.8.

In the congested district the average schedule speed is 6.29 m. p. h. The average equivalent stops per mile, 11.9; the average duration of actual stops, 10.02 seconds.

Congested district loading is facilitated by the use of street collectors. This, however, is no added expense, as we have always used them in the downtown district during the rush hour, loading the front end of double-truck units.

During the five months operation in Kansas City on this line there has been no reduction in vehicle accidents over previous operation. However, there have been no accidents which could be traceable directly to the safety cars. On the contrary, certain classes of accidents have been entirely eliminated by reason of the safety devices. For example, of the 1,900,000 passengers carried in the period, there has been but one step accident and that was caused by passenger attempting to board the car and slipping off a slippery step. In other words, such accidents as we have had would have occurred with the double-truck unit.

As I stated before, I do not believe, with some of the safety-car enthusiasts, that it can be used in large cities on all lines. I am sure, however, that within its traffic limitations, disregarding any increase in passenger business, the increased service and decreased expense it makes possible justify its adoption in any city. On those lines where it is applicable I also believe it is the only method of providing the frequency of service our public demands within the limits of our present revenues.

Some Changes Made in Equipment

So much for the service and revenue characteristics. Now a word as to the type of equipment. When our company purchased the first order of cars, we desired to make certain changes but were emphatically told by the car companies that any change would tend to mitigate against the success of the car. The plan, in short, was to provide a standard car. Because of its being a standard car it could be manufactured in large lots and the cost of both material and of the construction thereby appreciably lessened. So we put aside our personal wishes in the matter in order to help to this new panacea—the "standard car." Yet the cars had hardly been placed in operation in Kansas City before the builders were seeking to sell us a different type of truck. Shortly afterwards we bought five additional cars and these and the sixty-five lately purchased are no longer the so-called "standard car," but the type of car we think best suited to our traveling public.

After all, the "safety car" is an operating idea, and this idea we feel can be expressed in different forms. I do not mean to convey the thought that the car should be redesigned. Such is not the case. We do feel, however, that from an engineering standpoint the underframing of the original safety car was exceedingly weak; the coupling connection was poor; the arrangement of the underframing members not of the best and, in a desire to reduce weight, weakened beyond the point of safety. The notion of reducing weight is commendable and these matters are more or less comparative. In fact, the radical innovation with respect to the reduction of weight in a safety car and as carried out, not only in the design of the underframing but in the entire design of the car, is one of the most commendable features of it. Yet the larger street mileage of this country is built on track centers to provide for an 8-ft. 8-in. to 9-ft. car. The standard safety car was originally designed for Stone & Webster's lines in Texas where the centers are narrow. As a result, these cars are but 8 ft. in width and with the consequent very narrow aisle.

They were built for Southern climates and the standard safety car comes along therefore without interior side or headlining. The standard safety car had eight heaters, yet the builders are now recommending twelve. I think a sufficient number of these points have been stated to develop the reasons why the original safety car, as such, was unsatisfactory to us, and why in our future orders we have made changes in order to remedy what we considered inherent weaknesses in the design as originally arranged.

Many of these changes are predicated upon the notion that the car presents too radical a departure from the established order of things to expect the public to take to it. In other words, if a man is accustomed to riding in a Pierce-Arrow, you must not reasonably expect him to pay the same fare for riding in a Ford without a complaint. You ought to start with an intermediate priced car, although it has perhaps truly been stated that the difference in price between a high-priced car and the cheap car is largely in the number of accessories on the former. So, in the cars lately purchased by the company, we have changed the original design as follows, holding to the original width and length:

About 500 to 600 lb. additional has been placed in the underframing and the members somewhat rearranged. The coupling arrangement has been changed so that the coupler is concealed. A 5-in. channel has been used at either end of the car for the bumper instead of the original 3-in. channel and the bumpers have been covered by a thin sheet of steel, in order to prevent boys from riding on the rear of the cars, the former exposed bumper providing a most convenient foothold for such class of passengers.

The interior of the car has been equipped with both side and headlining. The number of heaters have been increased, including one front cab heater. Steel wheels have been substituted for cast chilled iron, in order to eliminate the large number of flat wheels which shortly developed in the operation of these cars. We found the step heights objectionable, and by lowering one member at the front end of the car have succeeded in getting a 2-in. ramp and reducing each of the step heights 1 in. The car, in our opinion, was excessively noisy, therefore rubber pads have been provided where the body rests on the cantilever springs.

Now as to the seating arrangement. I know that many will take issue with me, but our observation in the five months operation in Kansas City convinces me that the public will not walk back through a long, narrow aisle. In fact, the idea of the original seating arrangement with a long narrow aisle is directly counter to developments in

seating design in street cars for the last ten years, the advantages of the loading well being completely pushed aside. It may be that the traveling public in Kansas City is peculiar in that respect, but the cars purchased by us were to provide service for people who have that characteristic, and we feel it is easier to fit the car to the public than to expect the public to accommodate themselves to a certain design of car. We have, therefore, removed the first two cross-seats on each side and placed longitudinal seats instead. This provides a loading well and does away with the objectionable congestion about the front door which these cars developed during the rush-hour period. Experience with both designs has proved the one with the loading well to be superior.

The motorman's curtain arrangement is a source of annoyance and excessive maintenance on the car originally designed, there being three curtains, one of which was continually out of order and generally found stored in one corner of the car. We have changed the rail somewhat in the front of the car to permit two curtains being used and also to furnish the motorman more complete protection against intruding passengers.

We have also taken the various switches, fuses, etc., which litter up the front of the car and put them in one cabinet on the floor conveniently near the motorman's left foot against the inner side of the car. We have likewise provided a small box in which the motorman can keep his trip sheets, collected transfers and report blanks, etc., and have also placed a small wooden tray in front of the motorman for his punch and watch. The builder, at our request, has provided sanitary molding throughout the car and has so arranged the corners where the side plates join the floor as to permit the car to be more readily cleaned and eliminate dust pockets. We have arranged for the side sash to lap at the upper part of the lower sash in order to make the car more waterproof and also changed the back center seat underneath the rear window so it becomes a folding seat, this due to the difficulty in replacing a trolley with a fixed seat, our experience being that a motorman replacing a trolley generally jumped on a seat and as a result in a short time a large number of them were broken.

RESULTS OF SAFETY CAR OPERATION, SUNSET HILL LINE
MAY TO SEPTEMBER, INCLUSIVE

	1918	1919
Receipts		
Total	$87,645	$93,412
Per car-mile, cents	26.25	21.11
Per car-hour	$2.623	$1.846
Direct Expenses, Wages and Power		
Per car-mile, cents	13.31	7.14
Per car-hour	$1.33	$1.63
Operating Data		
Car-miles	333,852	441,443
Car-hours	33,408	50,601
Wages		
Per car-mile, cents	8.68	5.55
Per car-hour, cents	86.8	48.4
Power		
Per car-mile, kilowatt-hour	3.86 kw.	1.325 kw.
Per car-hour, kilowatt-hour	38.6 kw.	11.57 kw.
Net Revenue		
Per car-mile, cents	12.94	13.97
Per car-hour	$1.292	$1.224
Total cost	$44,435	$31,519
Total saving		$12,916
System increase five months		2.02 per cent
Sunset Hill increase		6.72 per cent
Sunset Hill increase over system increase		$4,119
Total increase in net revenue due to safety cars		17,035
Total yearly increase at the rate of		40,884
Increase in net		$40,884
Increase in car-miles, per cent		32.22
Increase in car-hours, per cent		51.46
Increase in rush-hour cars		5
Decrease in rush-hour headway, from four to two and one-half minutes		
Decrease in non-rush headway, from eight to six minutes		

Now as to the seats. Against the advice of the car builders we have decided to put in cushion seats. In our opinion, the car as originally furnished is entirely too cheap. In an endeavor to provide a cheap unit it has been actually skinned to the point where it was really difficult to get the public to patronize it. It was too radical a departure, and no point illustrated this feature more than the seats themselves, which were fragile, uncomfortable and differed radically from the seats which our public has been accustomed to even in our older obsolete cars. As a result, in the cars just delivered and now under order, we have decided to install cushion seats. Theoretically they may not be one bit more comfortable than the slat seat but the public to whom we are catering in Kansas City are accustomed to and desire a cushioned seat, and we deem it our business to furnish them with what they wish. We are certain that the added cost of these seats is more than offset by the good-will which will result from their usage and from the additional favorable opinion which the safety car will meet. Of course, our experience has been slight, the cars have only been operated five months, but the explanation given here is our best opinion, and really, when analyzed, the changes do not affect the car greatly. In fact, with all the improvements and changes above mentioned, the car will weigh slightly under 16,000 lb.

The weight of these cars has been overemphasized. We have now builders and master mechanics seriously discussing the advisability of a 16,000 lb. or 17,000 lb. car and analyzing the relative benefits and cost of both, whereas up to this time we have operated cars weighing as high as 57,000 lb. seating thirty-five passengers, which did not seem to worry either the car builder or the master mechanic. For a road which has several hundred cars weighing more than 50,000 lb., it really seems a waste of time to discuss whether or not the safety car should weigh 16,000 or 17,000 lb. As a matter of fact, three fat passengers taking the place of three lean ones would make just as much difference in weight as the additional weight consequent upon the slight changes we have made would place on the car.

General Observations on Birney Cars*

The Results of a Recent Trip to Inspect Safety Car Operation Are Given—Conclusion Reached that the Car Is Well Adapted to Operation in Large Cities

BY J. C. THIRLWALL
Railway and Traction Department General Electric Company

IT HAS BEEN my privilege during the past six months to have made a trip on which I was enabled to study and secure first-hand information on the operation of Birney safety cars in some twenty cities scattered over the country from Bridgeport and Richmond in the East to Pomona and Seattle in the West. The impressions obtained are based on talks with officials of the various properties, with the men operating the cars and with passengers riding them; and in all the installations visited, with one exception, the verdict was unanimous, that this new form of transportation is a complete success and equally popular with the riding public, with the trainmen, and with the management. In the cities I visited there are in operation today approximately 400 standard safety cars and about fifty one-man cars of other types. The cities visited range in size from 15,000 to 30,000 as in the case of Pomona, Riverside and Redlands, Cal., up to the very largest in

* Abstract of paper read before the Transportation and Traffic Association, Oct. 7, 1919, at Atlantic City, N. J.

which safety cars have yet been used, including Portland, Seattle and Brooklyn. Various methods of applying safety cars were observed from straight car for car replacement through varying degrees of improved service up to one instance where the number of cars was more than doubled. The notes that I am presenting today are simply a brief summary of the results obtained.

The Pacific Electric Company in California has thirty-five cars distributed among the smaller towns through which their interurban lines operate, namely, Stockton, San José, Fresno, Pomona, Redlands and Riverside, with populations ranging from 15,000 to 30,000. They have used the Birney cars to replace older single-truck types without any change in frequency or schedule speed. Since all of the lines on which this has been done were lines of extremely light traffic, they have met with no difficulties and have secured a saving of more than $2,500 per car per year on platform expenses alone, with probably a slight additional saving in power and maintenance. The public has secured a more comfortable vehicle, and without any change in speed or frequency, passenger receipts showed a slight but satisfactory increase after the safety car went into service.

In Fort Worth where they have forty Birney safety cars, nine lines are equipped and on six of these the installation was on a car for car basis, these being routes where single-truck cars had previously been used and where the traffic was extremely light at the time the installation was made, although at the present time the riding is fairly heavy on all of them. On two of these lines, however, the speed was materially increased with the Birney car and headways thereby reduced. On the remaining three lines, the number of cars was increased and the running time materially shortened; the net result on the nine lines has been an increase of about 30 per cent in the mileage operated today as compared with what was given before the Birney cars went into service. The population has been increasing so rapidly during the past three years that it is difficult to estimate the effect of the improved service on earnings, but on these lines with 30 per cent more mileage they are taking in 70 per cent more money this year than they were two years ago. Each safety car is handling considerably heavier traffic than did the cars they replaced, and in spite of their heavier traffic, they are making considerably faster schedule speeds. For instance, on one line where the earnings have risen from 20 cents per car-mile to 27 cents per car-mile the present schedule speed is 10.2 m. p. h. where it was formerly 8.5 m. p. h. On another line where the earnings have risen from 19.4 cents to 24 cents per car-mile the speed is 10 m. p. h. where formerly the schedule speed was 8.4 m. p. h. On a third-line, where the earnings have risen from 21 to 28 cents, the speed was increased from 6.9 to 10 m. p. h. They are handling this greatly increased traffic at a very materially reduced operating cost on the main items of power, maintenance, platform wages, depreciation and expense. They estimate that the life of their rails on these lines will be extended fully 50 per cent, and their judgment is based on three years of operation. The original lot of cars that went into service in this city in November, 1916, have stood up excellently, and their maintenance has been considerably lower than that of the cars they displaced.

In Austin, Tex., a city of about 35,000, seven safety cars took the place of a like number of older single-truck types, and they estimate that their savings in wages, power and maintenance amounts to about $2,500 per car annually. No heavy traffic conditions were encountered here, and no difficulties in operation have been experienced.

In Portland, Ore., where they have twenty-five safety cars, an attempt was made to replace large cars on lines of heavy traffic on a car for car basis. The results were not encouraging. Schedules were slowed down, the union platform men objected to the new form of operation and to such a degree that it was frequently impossible to crew up the entire number of cars required daily. Even under these circumstances the company's records indicated savings of approximately $2,000 per car annually, but it was pretty evident that additional cars would have to be operated on shorter headways to prevent criticism on the part of the public and of the employees.

The Birney car is inherently so much faster than the older single-truck type that it can usually make a considerably faster schedule with a single operator than the old car with two men, but where double-truck cars are replaced on lines where riding is really heavy there is less difference in the accelerating and braking rates in favor of the Birney car, and greater delays result from one-man handling of passengers. The net result, unless additional cars are put on the lines, thereby reducing the number of passengers handled per car trip, is to slow down schedules, to which the public seriously objects.

In all the other cities which I visited the Birney cars have been used for the most part to improve service, more cars being used than formerly, and in some cases higher schedule speeds being operated. For instance, in Houston, on the first line equipped seventeen Birney cars took the place of ten double-truck cars, the running time was shortened and the mileage increased about 80 per cent. They have there thirty-one standard safety cars and fourteen older cars with safety features which are being operated with one man. Of these fifty-five cars forty-eight are regularly operated. On the entire seven lines equipped they formerly operated 160,000 miles per month. With the safety cars this has been raised to approximately 200,000 miles per month, an increase of 25 per cent. The results from this improved service have been very gratifying for they have made possible this increase in mileage while still showing a considerable decrease in operating expenses, and the receipts on the lines concerned have risen nearly in proportion to the improvement in service.

In Beaumont, where twenty-four safety cars are being used, they now operate thirty-five cars where in July 1918, they were operating only twenty-two. Three out of four lines are now using one-man cars, and the entire system shows an increase in mileage of 50 per cent as a result of safety car operation. The result has been that in spite of an increased fare, which was secured largely through the promise of improved service with safety cars, they are carrying more people today than they did last year, and with only a very slight increase in total operating expenses.

In Terre Haute, a city of 75,000 population, where Birney cars have been operating for a year, five lines were equipped with twenty-six cars. Although single-truck cars of no greater capacity than the safety cars were displaced, additional cars were put onto each line and schedule speeds increased, giving the public about 30 per cent more service. Here again, the increased receipts amply justified the cost of the improved service, although total costs of operation were reduced. The entire installation enabled the company to change from a thirty-car system to a forty-two car system and has been so entirely successful that arrangements have recently been made to equip every line in the city with safety cars. This, I believe, will be the first city of such size to be entirely equipped.

In Dallas they have twelve safety cars which were used to improve service about 50 per cent on the one line they have equipped. The increased receipts resulting from this installation amply justifies the improvement in service while the cost of operating the line was somewhat reduced.

In El Paso, where they operate twenty standard cars and five old single-truck converted safety cars, they have equipped seven lines for all-day operation, increasing the service 30 per cent through the day and 50 per cent during

rush hours. In general, their receipts have increased almost proportionally to the increased mileage, while their operating accounts are materially lower. All cars in El Paso are equipped with meters, and the average consumption of the Birney cars on level track is 0.92 kw.-hr. per car-mile. Their average on all lines including some with extremely heavy grades is 1.03 kw.-hr. per car-mile. The average consumption for their 20,000-lb. single-truck car is 1.45 and for their 39,000-lb. double-truck cars 2.5 kw.-hr. per car-mile.

In Tacoma, Wash., with a population of 120,000, they are operating sixty-one standard safety cars. In this instance, radically increased service was given when applying the new cars, but data as to increased earnings resulting therefrom are not available because traffic on the entire system was growing so rapidly, due to increased population and war industries. An interesting comment was made, however, that during the shipbuilding rush last year they regularly handled eighty to eighty-five people in their Birney cars without any damage to the bodies, trucks or equipment, but because of these heavy loads and some very severe gradients they found it necessary to raise the braking pressure on the cars to 120 per cent of their light weight. They say that this has caused no trouble with flat wheels, the empty car being too light to cause wheels to flatten when they slide. The comment is that they have been able to meet with these cars tremendous increases in traffic at a very materially lower operating cost than would have been the case with older types.

Seattle, a city of 400,000 people, has sixty standard safety cars on which the comments are much the same as in Tacoma. The cars here operate on some lines through the most congested traffic in Seattle where rush-hour headways on the downtown portion are about thirty seconds. They have experienced no difficulties in maintaining schedules equal to those of their larger two-man cars.

In Bridgeport, a factory city of about 180,000 population, the initial installation of nine Birney cars replaced four double-truck cars. This is the most striking example of improved service that I know of. Under the circumstances, operating costs were somewhat increased, although the cost of power was reduced (since nine Birney cars weigh less than four double-truck cars), but the increased receipts resulting from this installation and which could be attributed to nothing else but the improved service, have been sufficient to pay a more liberal return on the cost of the cars than has been obtained in most installations where the cars were applied on a straight replacement basis.

In Brooklyn, in their initial installation of twelve cars, they doubled their all-day service on two lines and materially increased their rush-hour service, giving about 90 per cent more mileage. Here too, there was an increase in operating expense since the new cars were simply added to their existing service, but the increased receipts resulting therefrom convinced the company that there was a wide field for their efficient use in Brooklyn and led to their recent purchase of 200 cars.

In Trenton, N. J., where they now operate twenty safety cars they were applied on a ratio of three new cars in place of two old cars, which gives 50 per cent more service to the public. The increased riding resulting therefrom has more than justified this action, although on the original installation there was no question but that car for car replacement could have been made without any operating difficulties.

In Richmond, where twenty of these cars are in operation, the public gets about 40 per cent more service, the company has reduced its cost of operation, and the public sentiment, as reflected both by letters of commendation and by increased riding, has been extremely favorable.

In general, my trip convinced me more thoroughly than ever before that the real field of the safety car is not on lines of extremely light traffic and earnings, but on all-day runs of the majority of lines in most of the larger cities; that the best results in every city of any considerable size will be obtained by using the cars to stimulate riding and to increase gross revenues by better service; that to the public better service means shorter headways more than anything else, although greater comfort, higher schedule speeds and increased number of seats are all important factors. It has been demonstrated beyond the shadow of a doubt that the Birney car, properly applied, can handle a considerable part of the service in any sized city; that they can operate successfully on extremely short headways and under the most congested conditions of vehicular traffic, and that they can make schedules at least as rapid as the cars they displace and very frequently schedules much faster. I am convinced that there is no city in the United States in which a considerable part of their all-day runs could not be handled more efficiently and more economically with the Birney car than with any other type now in existence. Its general design is entirely satisfactory. Some minor modifications in structure may be desirable, but the Birney safety car as a standard is no longer an experiment. It has established itself indubitably as a complete and absolute success.

Service and Jitney Competition*

The Birney Car Was Designed to Compete with the Jitney—How the Automobile Effected a Change in Car Design

BY G. H. CLIFFORD
Vice-President Northern Texas Traction Company

JITNEY operation was responsible for the design of the modern one-man car, the thought being at the time that we should furnish to the public a service embodying the attractive features of the jitney. Everyone familiar with jitney operation will agree that in addition to the novelty of riding in an automobile for a nickel, the service was attractive because of its superiority in frequency and speed. The one-man car was designed so that its cost of operation would permit frequency of service; its seating capacity, weight and equipment were designed for better average speed and safety.

Students of transportation will agree that the public of today is interested only in service, and that the two important elements in service are: "Giving them a car when they want it" and "Getting them to their destination as quickly as possible." This is what the jitney was able to do and what is being successfully done with the modern one-man car.

That jitney operation was economically unsound and impossible as a means of furnishing complete transportation service, everyone now agrees, but it is equally true that the jitney when permitted to operate on short hauls in profitable territory will furnish a service of such frequency and speed that the operation of one-man cars will not prevent them from hauling quite a percentage of the traffic. Operating under such conditions the jitney is not, in a real sense, a competitor of the street railway, and can only be stopped by prohibitive legislation, which has been enacted in most parts of the country. Therefore, I would not take the position that any service which might be inaugurated with one-man cars would eliminate jitney competition, but the one-man car will, to a great extent, provide all the attractive features of jitney service and in addition economically furnish the entire transportation needs of the

* Abstract of paper presented at meeting of Transportation & Traffic Association, Atlantic City, N. J., Oct. 7, 1919.

public to the extent that when jitneys are eliminated the public is adequately cared for and is well satisfied.

STREET CAR FASTEST BEFORE AUTOMOBILE

Before the advent of the automobile the street car was the fastest vehicle on the street. The question of speed being at that time satisfactory to the public, their thoughts ran more to the design and riding qualities of a street car approaching the Pullman car. Street railway managements wanting to meet the desires of the public built heavier cars of greater seating capacity with which car-mile earnings were increased. The cost of operating cars of such weight and seating capacity made infrequent schedules necessary. Time was not then considered as valuable as today, and people were content to learn the schedule of the line and watch the clock for the hour of their departure. If perchance they missed their connection or the car was late, there were no friendly automobiles to speed their departure and their nickel found its way to the street railway office. The automobile has now made the street car almost the slowest conveyance on the street and has taught our riding public the possibilities of time saving, which can only be accomplished with frequent and rapid service.

The low cost of operating the Birney one-man car makes it possible to satisfy the restless public of today, which, if not given a frequent and rapid service, will demand jitney operation or use the friendly automobile on many occasions. The modern one-man car is a most radical departure in urban transportation, and like every innovation it was difficult for operating managements to agree to give it a trial, and whenever a tribute is paid to the designer of the car no less credit should be given to his untiring energy and efforts in the education of operating managements to the idea and in gaining the co-operation of the manufacturers, who have at a great expense stood behind their equipment and made possible the great success which the car has attained.

The car has passed the experimental state. The public is enthusiastic about its operation where "improved service" has been the slogan in its introduction, and as the people from various sections of the country learn of the advantages of this operation, they will demand it and insist upon it in spite of all that can be said by those who for various reasons may not take kindly to the idea, and certainly the street railways will find it to their advantage from the many viewpoints outlined in the committee report.

Standardization of Birney Safety Car*

Quantity Production Made Possible Through Standardization Will Decrease Cost—Establishment of a Clearing House for Proposed Improvements Is Suggested

BY GARDNER WELLS
Consulting Engineer, New York

THE Birney safety car is bringing about astonishing results in increased receipts and decreased expenses. It is believed that still better results can be obtained through maintaining a fixed policy with regard to standardization. In this consideration there are three principal factors, namely: financing of equipment, quantity production and the maintenance of some sort of a bureau or clearing house to carry out the policy with regard to standardization.

When street railway companies were making money, or thought they were, the financing of equipment was usually an easy matter, and for the most part each company had its own type of car. Freakish fashions seemed to rule in many cases, and as usual this was expensive. Each company prided itself on being better than its neighbor, which was all very commendable as long as money was being made and the public did not object, but was not in the interest of economy. Street railways are now seeking in every way they can to retrench, and many of them are turning to the standard car as one means of relief.

The difficulty of obtaining money to finance the car is, of course, the first obstruction that is met with. The fact that a car is standard, however, appeals to the banker. It is good collateral in cases where cars are purchased through trust certificates. If a company becomes so insolvent, however, that due payments cannot be made, these cars may be resold by the banking concern owning them, and if the standardization plan is adhered to, they would be acceptable almost anywhere. In other words, they would be a kind of negotiable instrument.

There have recently been two or three instances where for temporary political reasons safety cars could not be used in the localities for which they were intended. They were consequently shipped to other parts and were put into immediate commission without alterations. Who knows but that the safety car may take the place of the dollar as a medium of exchange. It has most of the qualities that metallic money has, in that it is small, light, durable and may be easily transported and stored.

With regard to quantity production, we can do no more than generalize just at present. But that was about all that could be said in connection with the operating results that it was thought would be obtained before safety cars were put in service. The writer knows of a case whereby substituting safety cars for double-truck cars on one line of a company on a two-for-one basis, the receipts were more than doubled after a few weeks time. During the same period the receipts on the remaining lines in the locality in which the cars were operating remained practically stationary. The safety car expenses per car-mile were, of course, materially reduced. Predictions had been made in the above case that the increase in earnings would be only about 50 per cent instead of the 100 per cent actually obtained.

In the case of quantity production it would not be possible to predict just at the present time exactly what savings can be made. It is believed, however, if the matter is taken hold of in a united way, that a material good can be accomplished, because if large quantities of articles of practically the same type can be manufactured cheaper than the same quantity with constantly varying types. The same holds true in connection with repair parts.

Someone has called the Birney safety car the Mazda lamp of the railway industry. The standard of the Mazda lamp is sometimes changed for the better. No one would think, however, of asking for a special Mazda lamp to fit "local conditions."

Undoubtedly improvements will be made from time to time in connection with the Birney car. But in the process of evolution the great danger will be that "sports" will be produced that will hinder rather than help this process. Motor equipment, wiring and all parts should remain standard. Even painting, it seems to me, should be standardized. The standardization of four motor cars which was started by the War Board should be carried out. It is believed, therefore, that some central body or clearing house should be established to keep the process of evolution in proper line.

In connection with the whole subject, as outlined above, a canvass of many of the principal operating companies was made recently in behalf of one or two companies interested in the matter, in order to get a general opinion in connection with the same. With one or two exceptions relative to minor details, the ideas have been favorably met with and in most instances heartily indorsed.

* Abstract of paper read at meeting of Transportation & Traffic Association, Atlantic City, N. J., Oct. 7, 1919.

Accounting Measures to Meet Business Depression in the Industry*

Affluence and Business Depression Occur in More or Less Regular Cycles—Rates Should Be Sufficiently High to Permit of an Accumulation of Reserves in Good Years to Offset Losses During Periods of Depression—Correct Accounting Practice Is a Real Factor in Lasting Prosperity

BY EARL A. SALIERS
Professor in Yale University, New Haven, Conn.

ELECTRIC RAILWAY men have numerous problems pressing upon them for solution, and more should not be added unnecessarily. The increased price of all that enters into cost of service is probably permanent. Price levels are higher because money is more abundant. Those who have been unable correspondingly to increase revenues are seriously handicapped. We may feel that present evils are sufficient and that to look into the future is courting trouble. But it is always best to plan a lasting success and doing so requires sound business foresight.

THE SWING OF THE PENDULUM IN BUSINESS AFFAIRS

The events of the future are at best uncertain, but not altogether so. Economic events follow each other in a kind of rhythm. Periods of prosperity are followed by periods of depression. During the past 150 years these manifestations have seemed to obey a kind of law comparable to the swing of a pendulum, and their recurrence has continued under changing conditions of government and finance.

The business world passes through cycles marked by alternate periods of activity and depression, but the theories which ascribe mathematical precision to this process have, I think, been largely discredited by facts. As more accurate statistics are now compiled of the output of mines, factories and farms, also of foreign trade and credit, we may expect these to yield information to the future inquirer.

Business depressions are distinctly modern phenomena. Before the organization of business on the modern scale there occurred extremes of scarcity and sometimes starvation in certain communities because of failure of local harvests, but these misfortunes bore none of the earmarks of business depressions. They resulted from failure in production due to natural causes. But the world is now unified —a great mart wherein occurs interchange of commodities between most distant parts. Harvest failures in one section are counter-balanced by successes elsewhere. The average productivity of the world does not vary greatly from year to year. Much of the raw material of industry is produced independently of the seasons. This is true of mineral and forest products which alone constitute more than 60 per cent of the freight tonnage of railroads in the United States. In the organization of business, and not in any known natural phenomena, do we find the best explanation of business depressions.

ACCOUNTANTS CAN AID IN MITIGATING THE SEVERITY OF DEPRESSION

Under the supervision of Hon. Carroll D. Wright, an investigation of the alleged causes of industrial depressions was carried out and the results were published in the first annual report of the Commission of Labor in 1886. So many possible causes of depressions were recorded therein that one writer has suggested that an attempt to find the true causes among such a number (about a hundred) would be like "hunting for a needle in a haystack." Many of these, however, can be eliminated by a process of selection and the really important possible causes of depressions will be found to number not more than twenty. Of these some of the most important are inflation, want of confidence, uneven production, extravagance and unemployment. I think that effect is often confused with cause. Thus it is conceivable that unemployment as a result might be mistaken as a cause of depressions.

Fortunately, we accountants can leave to the economists the further discussion of the causes of depressions, for we are more interested in the fact that they do occur than in their more or less remote origins. It is for us to do what we can to diminish the evil effects of depressions. By being forehanded we may help to diminish their severity, and the spread of a knowledge of accounting principles will be a potent preventive of financial disturbance. But should the possibility of future business depressions influence our policies to any great degree? If so, are we to adopt distinct measures or merely to shift our general policy to a somewhat more conservative basis?

Radical plans and revolutionary suggestions I shall not offer. The accountant's duties are constructive, nevertheless he is limited by existing conditions to fixed methods of procedure more or less.

The first noticeable effect on manufacturers of a depression is a falling off in orders; on transportation companies, a decline in revenues. This means less money with which to meet fixed charges, pay wages, make replacements of worn-out machinery and disburse dividends. Retrenchment becomes necessary and the form which it takes determines whether or not the enterprise has good staying power. Some obligations must be met to avoid foreclosure, and upon the payment of others current operations depend. There are also certain classes of repairs which cannot long be deferred without reducing the efficiency of the service.

ASSETS MUST BE CONSERVED THROUGH AMPLE RATES

A large part of the investment in electric railways is in the form of fixed assets. The term "fixed assets" is a misnomer, however, except in case of land which is for most purposes really a fixed asset. Many so-called fixed assets are wasting assets, differing, however, from materials currently consumed, such as fuel, oil, etc., in that they last a relatively long time and serve for the same purpose hundreds or even thousands of times. Now this investment in cars, track, buildings, etc., enters into the cost of service which an electric railway performs quite as truly as do wages paid to conductors, motormen and laborers, or the money paid for coal used to generate power. But it differs from the investment in inventories of supplies and from wages, salaries and repairs, in that it is replacement, and consequently the actual disbursement of cash takes place at infrequent intervals. The length of these intervals

* Abstract of paper presented at meeting of Accountants' Association, Atlantic City, N. J., Oct. 7, 1919.

corresponds to the useful lives of the assets. If, for example, steel rails will last thirty years, then that part of the cost of service represented by the wear and tear of steel rails need give rise to cash disbursements only at the end of a thirty-year period. Much capital is so invested that replacements are necessary only after twenty or thirty years.

What I desire to emphasize is, that when funds have been tied up in construction of a permanent character, the wear and tear resulting from their use in giving service is an element in the cost of that service and should be reimbursed to the company in current charges for service. If this is not done the company will fail in the long run.

Assume the case of an electric railway corporation which constructs its plant at a cost of $10,000,000, this amount being spent to purchase rails, rolling stock, etc., which, let us further assume, has an average normal useful life of ten years. Of course in practice the replacement of the entire plant will not be made wholesale but piecemeal; yet this fact does not affect the general proposition that on an average of ten years the cost of the fixed assets is wholly consumed in giving service. There enters into cost of service each year about $1,000,000 of expense which is liable to be neglected in fixing a fair charge for that service for the reason that it may be omitted for several years and the company will have enough revenue to meet current obligations nevertheless. I appreciate the practical difficulty of establishing an equitable charge, but that does not affect the principle at stake.

SERVICE CANNOT BE SOLD INDEFINITELY BELOW COST

Carrying our illustration to its logical conclusion, let us assume that five years pass during which enough revenue is obtained each year to pay current obligations. No attention, however, is given to the fact that one-half of the average useful life of the fixed assets is past except in so far as occasional renewals have become necessary. I contend that in failing to make a charge sufficient to cover not only current expenses but also the exhaustion of capital invested in fixed assets, the company has made a gratuity to the public in the form of service below cost, that this policy leads toward bankruptcy, and that it should be avoided, if possible, by making adequate charges *from the beginning*. If ten years pass before any charge is made for use of plant, it may be difficult to explain why the charge should be increased although the increase is wholly justifiable.

One thing should be noted, namely, that to get back from the public during the next ten years what was given them during the first ten, and at the same time make necessary replacements the company will be compelled to charge twice the normal cost resulting from wear and tear on its plant; for since it neglected each year of the first ten to charge $1,000,000 for use of plant, to which it was wholly entitled, it should with propriety be permitted to charge $2,000,000 each year for the next ten. This illustration may be extreme in its neglect of details, but it proves that nobody can be prosperous on an annual deficit.

I need not be specific about what should be done with the money collected each year of the ten when an adequate charge is made. That is a matter of practical finance to be determined by circumstances. If it is neither distributed as dividends nor otherwise improperly used it acts as a financial bulwark and does more than any other feasible thing to place the company on a basis that will enable it to weather future business depressions.

Let us see how this works out. Experience teaches us that we should expect a considerable depression at least once in twenty years, also that the duration of severe depressions is not ordinarily more than two or three years. Since the organization of our present government no period of twenty consecutive years can be selected which does not present evidence of depression in some part. Perhaps the same might be said of shorter periods of time. When past experience shows what we may reasonably expect in the future we ought to shape our acts accordingly.

How much a depression will reduce revenues is problematical. It differs with different industries, and public utilities are in some respects more fortunate than manufacturing concerns because of the very fundamental character of the service that they perform. Nevertheless they cannot escape altogether. Where men are unemployed they do not ride daily to and from factories; moreover, freight and express shipments are diminished. Reduced revenues result, hence reduced disbursements. What, under these circumstances, is the difference in staying power of the company which has been adequately reimbursed for all costs of service and the company which has failed to secure a return of expired investment in plant?

The answer to the question rests partly with the disposition of capital thus returned, but if it is employed legitimately the company is going to benefit and the particular form which the funds assume is not vital. There will exist, either in distinct form or suffused through the volume of the assets, a quantity of wealth which will afford cash or the credit to secure cash when it is needed. This is true because funds destined for the replacement of fixed assets may be deviated from that purpose for a time without evil results. It may be that a portion of such funds can be permanently turned to other purposes.

Bankers are coming to depend more and more upon certified balance sheets, and being conservative men, they will not grant loans unless assured that balance sheet values are real and not merely the reflection of values now extinct. We cannot hope to prevent our balance sheets from becoming discreditable if we do not put back into property what we take out of it.

PANICS AND DEPRESSIONS RESULT FROM THE SAME CAUSES

Sometimes financial depressions are preceded by panics. Panics are more intimately related to the stock and money markets than are depressions, but they spring from the same general causes—over-speculation, over-expansion and over-confidence—and when such conditions are fundamental and widespread the resulting panic is fairly certain to be followed by depression. Panics aggravate the evil results of depressions by placing an artificial emphasis on the necessity of reducing credits, thus causing greater contraction than conditions warrant. However that may be, the contraction affects liquid funds and circulating capital more than it does invested capital, because income from capital permanently invested is oftentimes fixed by contract and because it cannot be immediately withdrawn to meet pressing demands elsewhere. The income from some invested capital may increase but it is generally diminished, and the need for funds to supplement this reduced income is above normal at a time when those who possess them are least inclined to make loans.

As a consequence of the above we must study the amount and character of the current assets, not as abstract sums but in the peculiar relationship which they bear to the current liabilities. In the long run the status of the current assets may be less vital than that of the fixed assets, but when sharp turns in prosperity occur, such as accompany severe panics, great embarrassment may occur when fundamental conditions are good. The fate of many enterprises is then quickly decided. The ones to be tried most severely are those that allow an insufficient margin of safety in providing for the liquidation of their current liabilities. Just what constitutes an adequate margin of safety depends upon various factors—chiefly the character of the business. Men familiar with the details in a given case are better fitted

than I to say whether such a margin exists; I wish merely to emphasize as a matter of principle the necessity of having it. The electric railway business is a very fundamental and stable one, hence the cost of an adequate margin of safety should not be burdensome. The financial world suffers first, and it takes time for the effects to be transmitted to all industry, during which time some opportunity is given to forestall its worst effects.

BUSINESS FAILURES HAVE WIDESPREAD EFFECTS

Every business has customary lines of discount and credit. These cannot be neglected without creating trouble at a time when credit is weak and cash at a premium. Therefore care must be taken that in normal times there shall exist a margin of current assets over current liabilities big enough to absorb the force of any sudden contraction, because contraction is accompanied by a scarcity of new credits, and as the word itself signifies, an attempt to reduce old credits. There are always some enterprises just on the ragged edge of solvency and if under stress they cannot secure help they fail. The more of such failures there are, the more liable are stronger concerns to be carried down. No enterprise can perish without leaving a series of consequences that, like circles in water produced by a falling stone, diminish in intensity as they flow outward, but affect a continually increasing number of other organizations. The failures of weak concerns are cumulative in effect and have two possible results; either their effects are neutralized through the absorption of their losses in the surpluses of strong companies or else the strong ones are also destroyed or weakened so much that a long period of liquidation follows and then reconstruction must be carried out on a more conservative basis.

We must provide business shock absorbers in the form of reservations and margins. These raise a corporation above the dead level of existence. To the extent that we do this we place ourselves in a strategic position and accomplish most through the least sacrifice. Honest statesmanship sometimes prevents war at small cost. Conservative accounting procedure may conceivably prevent panics and depressions and will at least diminish their severity. The spread of sound accounting practice has a beneficial effect which is cumulative in nature. Not only are those newly converted to its use directly benefited, but others as well, because common losses are reduced. Correct accounting practice is a real factor in lasting prosperity.

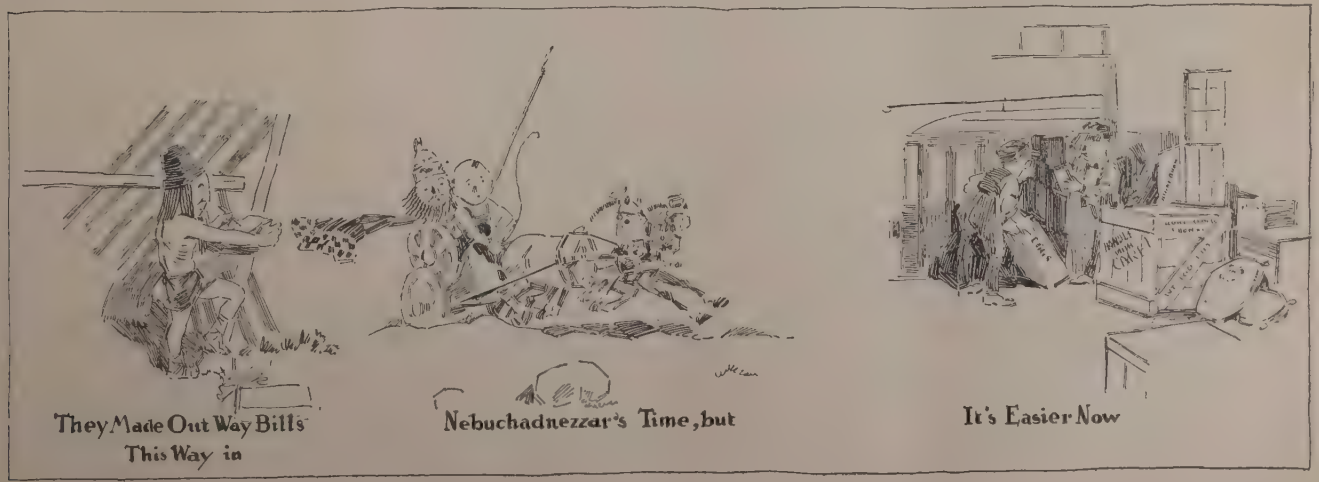
The diseases of the business world resemble those which attack the living organisms. It has been said that the difference between a man and a clock is that when the clock runs down it stops, but a man keeps going after he runs down. We are sometimes compelled to keep going when the logical thing to do it to stop, take stock of affairs, find the trouble and apply a specific remedy. But we need not shut off the power and stop the machinery if we act promptly, any more than a man needs ordinarily to enter a sanatorium if he looks diligently to his health before he loses it. A man is overworked when the vital forces are consumed faster than they are replenished. The same is true of a corporation—it cannot undergo continuous drain on its reserve forces without damage to itself.

The steps necessary to meet business depression are those which constitute conservative policy. We will all agree that those measures which can be taken as preventives are better than makeshift cures instituted at the last moment. A system of accounts has a purpose as well as a detailed procedure. Corporations are usually organized for an indefinite period of existence and the accountant should shape his policy to meet the demands of tomorrow. He cannot do this unless he recognizes the true character of fixed assets and how they fit into and form part of invested capital. The plan of "service at cost," already adopted in several large cities, emphasizes the necessity of determining what the elements of cost are. L. R. Nash, of Stone & Webster, and others have shown that service is not "at cost" unless in cost there is included an adequate charge to cover the use of fixed assets as well as to provide for current expense.

It has been and still is the belief on the part of many that all that can be accomplished by the measures that I have been considering can be equally well accomplished through a general surplus account to which there is carried each year part or all of the annual profit. Certainly there can be no objection to a surplus account, but we must keep distinctly in mind that no real surplus ever exists so long as invested capital expired is not returned, through the rates. The surplus account, when properly used, is distinctly an excess account into which undistributed profits are collected.

Ordinarily there is nothing to prevent the distribution as dividends of the entire surplus, because it is in no way related to the problem of preservation of investments. Many so-called surpluses are in reality not surpluses at all, because all proper costs are not charged and the apparent profits exceed real profits by just the amount that the company understates its cost of operation. A paper surplus is a delusion and tends to create a feeling of confidence not justified by the real condition of affairs.

What I have said is based on the assumption that revenues are adequate. That they are not always so I am fully aware. How to make them so is a matter affected by factors quite irrelevant to the discussion in hand. I mention it here because I am not unsympathetic with the difficulties that usually have to be surmounted before effective things are accomplished.



Fare Collection with Frequent Changes in Rates*

Experience in Denver Shows That There Is Little Complication When Fares Are Changed If Metal Tokens Are Used—Simplification of Collection Devices Is Necessary to Relieve the Conductor of Many of the Extra Duties Incident to Odd-fare Collection

BY W. A. DOTY
Auditor Denver (Col.) Tramway

FARE collection systems in this country may be divided into two general classes, the "collect" system and "prepayment" system.

The "collect" system is that in use where the conductor passes back and forth through the car, making the collections from the passengers and registering the different classes of fares collected. The registration may be a single-fare classification or there may be two, three, or four classification of fares, such as cash, tickets, transfers, half-fares, etc.

The objection to the collect system is that the full revenue to the company is dependent upon the alertness of the conductor, for unless he actually solicits the fare required from each passenger there is no provision for the company to receive its revenue. Due to many causes beyond the conductor's control his attention is diverted from fare collection and his company does not receive the revenue to which it is entitled. For this and other reasons the writer is not in favor of this method of fare collection and will not consider it further in this paper.

In the "prepayment" system the fare is collected as the passenger enters the car, the conductor actually receiving the fare and recording it on a register; or, passenger depositing certain classes of fares, usually cash fares, in a fare box. The conductor registers the fares as deposited in the box and receives transfers and paper tickets direct from the passenger. With few exceptions, notably Detroit and Cleveland, he also registers these as received.

When fare boxes are used in the prepayment system, the fare is deposited in the box by the passenger, thus affording the passenger an opportunity of depositing the correct amount of his fare upon boarding the car. This generally obviates the objection to the collect system based upon the necessity for the conductor to solicit the fare from each passenger.

There are types of fare box which are closed to the conductor, everything deposited in the box by the passenger remaining in it until the boxes are removed and sent to the treasurer's office and the receipts for the day determined by the contents of the box. Such boxes are usually designed to receive paper tickets. Other fare boxes, known as "registering fare boxes," are so constructed that the fares deposited by the passengers are registered as they pass through the box and the coins are immediately available to the conductor for change and resale to subsequent passengers boarding the car. The latter boxes are sometimes equipped so that in addition to registering the pennies, nickels and dimes, they will register metal tickets. These boxes generally do not receive paper tickets.

The equipment used in Denver is of the registering type, registering pennies, nickels and dimes and two different metal tickets. The fares deposited in the box by passengers are registered on an overhead register by the conductor. In addition, the conductor registers on this overhead register the tickets and transfers which he receives.

With the advent of the 6-cent fare in Denver the fare boxes were equipped to register two different metal tickets in addition to the customary denominations of money. One is a large metal ticket for half fare, which is sold at 3 cents, while the other is a small metal ticket for adult fare which is sold at 6 cents. These metal tickets register through the fare box separately in quantities as distinguished from the registration of the money which is done in terms of dollars and cents.

By this method of fare collection we have been enabled to collect practically 100 per cent of our passenger revenue through the fare box. Prior to the installation of this system, a number of revenue tickets were printed for different industries throughout the city. The printing of these paper tickets was some expense, and there was a considerably larger expense for handling and burning the tickets to prevent their reuse. Since these tickets were not deposited in the fare box, there was some loss through careless handling by the conductor. Under the old system there were collected and handled through the different departments between 8,000 and 10,000 revenue tickets per day. Under the present system these have been eliminated. The amount of revenue is now accounted for in the cash collections each day without increased labor.

LESS THAN $2,000 LOST IN RAISING FARES

When the Denver Tramway changed from a 6-cent fare to a 7-cent fare, which it did temporarily from Dec. 26, 1918, until Jan. 14, 1919, inclusive, it accepted the original 6-cent metal ticket for a 7-cent fare, effective with the date of the increase in fare. This resulted in a loss to the company of 1 cent each on the metal tickets outstanding, a total of $1,894. Of this amount, however, it was estimated that about $350 of the profit went to the trainmen because the company did not require them to turn in their working supply of tickets the day before the increase in fare went into effect. Upon the reduction from a 7-cent fare to a 6-cent fare the same plan was followed, in other words, the company accepted the same metal ticket for a 6-cent fare that had been good for a 7-cent fare the previous day. Due notice of the change was given the public when the fare was reduced from 7 cents to 6 cents and the working supply of tickets in the possession of the trainmen were redeemed so as to cause them no personal loss. The tickets in the hands of the public upon this occasion resulted in a profit to the company of $1,313. No complaint was heard and, generally speaking, the entire transaction seemed to be satisfactory to the traveling public. The experience of the company shows that when a fare increase is anticipated the public will not invest in more tickets than would be sufficient for one week's car fare.

On an average 200,000 cash fares are collected in Denver per day. From the date the 6-cent fare went into effect,

* Abstract of paper presented at meeting of Accountants' Association, Atlantic City, N. J., Oct. 9, 1919.

Sept. 15, 1918, there were collected for the ten days following approximately 50 per cent of the fares through the medium of full fare metal tickets. In about fifty days more this percentage dropped off to about 40. On account of the frequent changes in rates which have resulted from political agitation and the consequent uncertainty as to what the fare might be, the percentage of cash fares collected through the medium of metal tickets was still further decreased to about 33⅓ per cent of the cash collections and this has continued to the present. At the time the company was collecting 50 per cent of its revenue thus, approximately 170,000 adult metal tickets were outstanding in the hands of the public, not including those in the hands of the trainmen. Today, there are 160,000 metal tickets in the hands of the public exclusive of those in the hands of the trainmen. It follows therefore, that a 1-cent increase in the fare would cause the company to write off a value of $1,600 in order to increase the value of the tickets in the hands of the public to the new rate, and there would be a profit of the same amount upon a reduction in fare.

PENDING COST-OF-SERVICE PLAN MAKES TOPIC IMPORTANT LOCALLY

The cost-of-service franchise which will be voted upon in Denver on Oct. 22, provides that immediately upon its adoption the Board of Control shall prepare a sliding scale of fares. If the ordinance is adopted and a sliding scale of fares made effective as contemplated therein, it is expected that the fare will increase or decrease at approximately one-half cent intervals. The change of one-half cent then will be equal to one-half of the amount set out above or $800 as the difference in value of the outstanding metal tickets in the hands of the public when changing from one fare to another at one-half cent intervals. The practical result of all this is that in changing to the next higher schedule the company by accepting metal tickets at the old rate is postponing to the extent of about 7 per cent of one day's earnings the time before it realizes the full benefit of the increased fare.

The company believes this to be the practical way to make these changes. To secure an adequate supply of metal tickets carrying a different value for the different schedules of fares will require an investment of at least $2,500 for each schedule. Of course there are other methods which might be followed, as for instance, having paper tickets printed for the different rates of fare. This would likewise require additional investment in tickets, additional clerical expense in handling them, together with other objections previously cited, all of which, in the writer's judgment, are sufficient to cause us to adhere to the metal ticket plan.

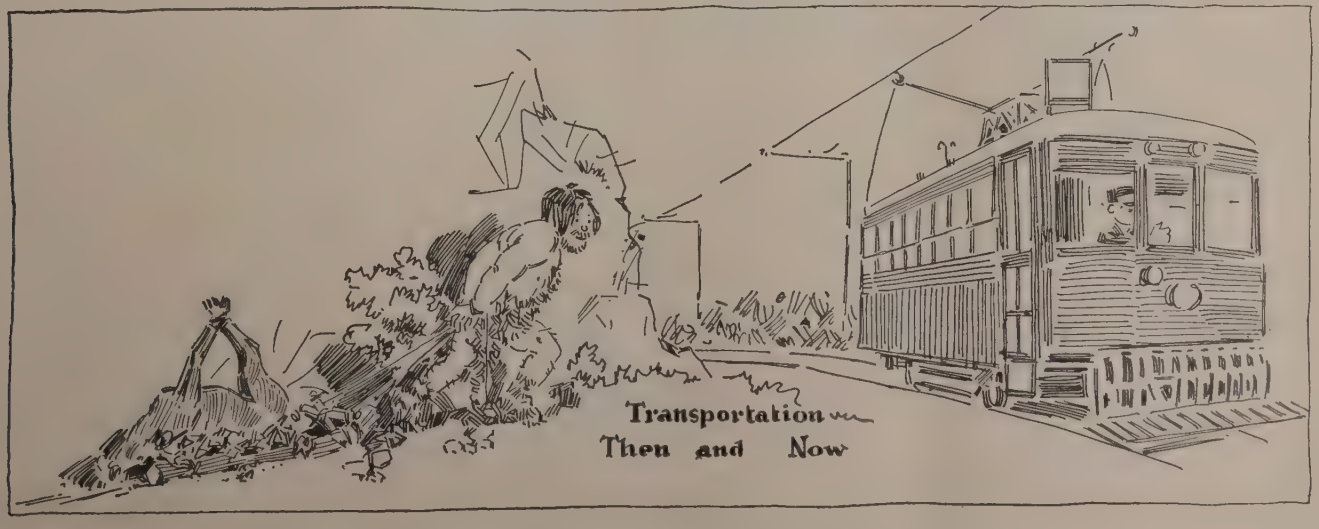
Under cost-of-service there should be close relationship between the utility and the public, and the public is interested to a large extent and is in effect in partnership with the utility in making the plan a success. Under these conditions and especially when adequate and full publicity is given the public, not only concerning the change in fares with special reference to metal tickets, but upon other matters concerning service and features in which the public is vitally interested, little, if any, complaint will be experienced.

FARE COLLECTION DEVICES NEED SIMPLIFYING

There is a problem confronting the electric railways in the matter of fare collection greater than many of us apparently realize, particularly with respect to the duties imposed upon the conductor. A typical nine-hour run requires more than 3,200 separate operations of the conductor, in addition to his preliminary work upon taking the car and the closing work necessary upon leaving the car, such as calculating register differences, wages, turning in trip sheets and cash, etc. This is nearly 400 operations per hour.

The largest element of expense entering into the operation of the electric railway is labor. A long step towards the saving of labor is no doubt represented in the safety car. However, with the safety car the time which the operator has to devote to the collection of fares must necessarily be a great deal less than that now devoted by the conductor under two-man operation. One of the prime needs of the industry is for increased production per individual operator. This cannot be met by longer hours because the tendency is, and no doubt will continue, for labor to demand and receive shorter hours. The solution then, must be sought in some improvement of the mechanical appliances for the collection and registration of fares, including also the issuance of transfers.

The time has arrived when substantial sums spent in developing and perfecting mechanical appliances will be justified if the result will meet the demands of the accounting officers of the utilities and at the same time eliminate most of the 3,200 motions now demanded of conductors. Substantial progress in this direction has been made, but some one machine should be developed which will meet most of our present requirements almost automatically, or at least with a minimum of effort on the part of the car operator.



Metal Tickets as a Substitute for Multiple Coins

Ten Advantages, for Both the Car Rider and for the Operating Company, Are Listed in Favor of the Metal Ticket

BY J. F. MCLAUGHLIN
Engineer Houston (Tex.) Electric Company

I AGREE heartily with the views of the committee on the collection and registration of fares that the use of tickets is desirable under many conditions, and in its preference for metal tickets. There is no doubt that where reduced rate fares are in effect the greater portion of the receipts of the company will be from ticket sales. In cases where the ticket fare and the cash fare are the same, the general tendency of the public is to pay the cash fare, and they will, in a great many cases have to be enlightened as to the desirability of using metal tickets. It is my belief, however, that the advantages from the use of metal tickets, both to the street car patron and the company, are such as to warrant a liberal use under all conditions, provided:

1. That they are sold only at company's offices, stations, and outside agencies, and no sales are made on cars;
2. That all fares are placed by the passenger in an approved registering collection device;
3. That the metal ticket is made of good material and difficult to counterfeit.

ADVANTAGES OF METAL TICKETS

As for the advantages accruing from the use of the metal ticket, it is my contention that its usefulness and value are greatest in taking care of rates of fare where an increase or decrease involving fractions of a cent are desired in an effort to arrive at an equitable rate of fare. In this connection, it frequently happens that the public mind, opposed to any increase in rate of fare, particularly one as large as a cent or over, would be willing to grant some relief through the means of a ½ cent or ¾ cent increase. This would also anticipate situations where a fraction of a cent increase in fare would give a company the necessary additional income; or where it was desired to work out a fair rate on the basis of fraction of a cent increases made over a period of time, on the theory that such increases would not be appreciably felt or objected to on the part of the public, and the traffic losses accordingly reduced to a minimum.

Due to the financial difficulties of the industry, many agreements are being worked out by the communities and companies on a basis of service at cost. In these franchises rates of fare are often expressed in fractions of a cent and changes in fare are frequently made on the basis of a proper net income. The use of metal tickets permits charging fares involving fractions of a cent and the transfer from one fare schedule to another without change of coin. In this connection it is advisable, on the day before reduced fares go into effect, to redeem, if the patron so desires, all outstanding coins at the high rate; and in case of increase of fares, to prevent the buying up of a large number of coins, by limiting sales made after notice of increase in fare is posted. It may be found desirable, in case of an increase in fare, to use a coin of different design.

The following is a brief list of some of the other advantages which can be realized from the use of metal tickets, whether or not operation is under a service-at-cost plan:

1. The amount of cash handled by conductors and operators is reduced to a minimum, and there is accordingly less chance for dishonesty.
2. The company receives a large portion of its receipts prior to the time that the service is rendered to the customer, which is desirable from a financial and merchandising standpoint.
3. Their use tends to decrease congestion in loading of cars by eliminating the necessity of making change, which (a) adds to the convenience of and tends to eliminate irritation of passengers; (b) decreases length of stop and fosters higher schedule speed; (c) permits conductors and operators to give more attention to the prevention of accidents.
4. The use of metal tickets tends to foster more riding, on the same theory that more money is spent by an individual purchasing on a charge account than if cash is paid for each purchase.
5. The use of metal tickets tends to make the patron forget that he is paying an increased fare, and the psychological effect on the car rider is therefore much better than if he is constantly reminded of the increase in fares by the use of multiple coins.
6. The use of one coin is preferable to two or more as it enables the conductor or operator to see plainly just what has fallen on the inspection plate of the fare box, which is especially desirable at points of heavy traffic where there is considerable likelihood of a passenger attempting to pass in without paying. Or, as frequently happens, he may drop a coin of smaller denomination into the fare box and then contend both coins were dropped and full fare was paid. In eliminating this cause of possible friction between the conductor and car rider, the metal ticket is most valuable.
7. Any fare value may be placed on a metal ticket.
8. The advantages from use of tickets increase as the number of units in the rate of fare increase.
9. The use of metal tickets does not involve any more detail work for the accounting department than that necessary to handle multiple coin fares.
10. Metal tickets can be sold at the company's office, stations or outside agencies without commission in rolls or envelopes of ten or other multiple, and recognized as a medium of exchange throughout the city or town.

* Abstract of paper presented at meeting of Transportation & Traffic Association, Atlantic City, N. J., Oct. 8, 1919.

American Association Proceedings

Service-at-Cost Franchises, Valuation, Zone System and Economics of Electric Railway Operation Were Principal Topics at Atlantic City Meeting—Committee of One Hundred Was Commended Also and Relations with Manufacturers Were Adjusted to the Satisfaction of All—President Pardee Was Re-elected

PRESIDENT PARDEE called the first meeting of the American Association to order on Tuesday morning at 10 a. m. in the Greek Temple. After reading his presidential address, which appears on another page, he called upon Secretary Burritt to read the report of the executive committee.

Report of the Executive Committee

The report of the executive committee prepared by Secretary Burritt is to be printed in the annual proceedings. This report covered in detail the activities of the association from the close of the 1916 convention and in itself was very complete. Among the many activities mentioned in the report were the opening of the association's offices in Washington and the work performed there during the war, and since, the appointment of the Committee of One Hundred to present the railways' case before the Federal Electric Railways Commission. Mention was also made of plans for the enlargement of the scope of the association's information bureau and the placing of an expert transportation engineer in charge. This change, it was hoped, would bring forth better results in the future to the company members who are seeking information on many and varied subjects. The report also contains the usual statistics regarding the memberships taken out during the current period, together with the estimated budgets of revenues and expenses for the three fiscal years covered by the report.

Report of the Secretary-Treasurer

The secretary-treasurer then gave an extended report of the activities of the association during the past year in his annual report. He said that since the War Board ceased its activities, the Washington office had been continued under the direction of W. V. Hill, who has represented the association in matters requiring attention before Congress and bureaus of the federal government. The mid-year meeting on March 4, 1919, was mentioned. The work of the Committee of One Hundred was described, and statistics were given of the number of contributed articles and questions and answers which had appeared in *Aera* during the past year. A considerable section of the report was given to the work of the Bureau of Information, and a number of its principal activities were mentioned. These included special researches, of which forty-three were conducted during the past year, the answering of special inquiries and the publication of bulletins on topics of electric railway interest. One of the most active matters with which the bureau has had to do has been to keep pace with the rapid changes in the rates of fare. The bureau has issued twelve bulletins during the year giving the fare situation in cities where increases have been granted. It has also issued six bulletins on wages during the year and has maintained a complete file of working agreements and wage contracts. It has also made a special drive to secure the complete financial returns from all electric railway companies, and an average of 143 companies have been reporting this year compared with eighty-seven last year. The largest individual undertaking handled by the bureau during the past year, however, was the preparation of evidence used before the Federal Electric Railways Commission. To do this in the allotted time it was necessary to reinforce the association's statistical staff by statisticians and other clerical assistants loaned from local member companies. The principal use of the information thus collected was the preparation of twenty-five large charts, showing in graphic form the present and former condition of the electric railways, and the tabulation of this information in statistical form. The bureau also assisted in compiling information required in the railway mail pay investigation.

INCOME STATEMENT: TEN MONTHS ENDING AUG. 31, 1919

REVENUES

Admission fees:	
Railway companies	$190.00
Manufacturing companies	470.00
Total	$660.00
Annual dues:	
Railway companies	$40,847.00
Manufacturing companies	9,241.50
Individuals	1,344.00
Total	$51,432.50
Miscellaneous income:	
Interest on deposits	$299.51
Interest on investments	134.79
Sale of year books and proceedings	159.73
Sale of engineering manuals and binders	70.45
Sale of "Cost of Urban Transportation Service"	31.50
Sale of bibliography on valuation	5.00
Sale of miscellaneous pamphlets	151.41
Sale of convention exhibit space	19,448.55
Sale of dinner tickets	7,495.00
Total	$27,795.94
Aera:	
Advertising	$12,134.51
Subscriptions—Railway companies	3,353.00
Subscriptions—Manufacturing companies	1,421.00
Subscriptions—Individuals	896.00
Subscriptions—Company section members	2,392.36
Paid subscriptions	159.17
Sale of extra copies	39.85
Sale of binders	3.50
Total	$20,399.39
Total Revenues	$100,287.83

EXPENSES

American Association	$52,330.49
Accountants' Association	14.00
Claims Association	1,438.85
Aera	22,123.79
Total Expenditures	$75,907.13

STATEMENT OF MEMBERSHIP

Company Members	Railway	Manufacturing	Total
Member companies beginning the fiscal year, Nov. 1, 1918	319	161	480
Reinstated member companies	12	11	23
New member companies	19	46	65
Total	350	218	568
Resignations	8	2	10
Net company membership	342	216	558
Withdrawn—Now under United States Railway Administration	3	0	3
Total, Aug. 31, 1919	345	216	561

Individual Members	
Individual membership beginning the fiscal year, Nov. 1, 1918	850
Reinstated individual members	1
New individual members	21
Total	872
Resignations and deaths since Nov. 1, 1918	10
Net individual membership Aug. 13, 1919	862

Company Section Members	
Company section members beginning the fiscal year Nov. 1, 1918	1361
New company section members	775
Total	2136
Resignations and deaths since Nov. 1, 1918	198
Net company section membership Aug. 31, 1919	1938

The income statement and statement of membership for the ten months ended Aug. 31, 1919, appear on page 43.

At this point the recommendation made by President Pardee in his address for the appointment of a committee of five to take up the consideration of increasing dues was acted upon and approved by the convention. The appointees on this committee were not announced at the first session.

In the absence of Calvert Townley, chairman of the committee on electrolysis, the report of this committee was read by Secretary Burritt. It stated that the committee had had no meetings during the war but had recently begun to take up more active work. It also commented briefly on the work which is being done in co-operation with the Bureau of Standards, which had appointed a committee comprising all interests concerned, known as the American Committee on Electrolysis. The American Electric Railway Association electrolysis committee is represented on the research sub-committee of this national electrolysis committee by P. W. Ripple.

Company Sections and Individual Membership

Martin Schreiber then read the report of the committee on company sections and individual members, an abstract of which follows:

In spite of the effect of the war and other unfavorable conditions in the electric railway industry, the company sections of the American Electric Railway Association have held their own.

Since the last report of the committee in 1916, the joint section of the Toledo Light & Railway Company was formed and now consists of approximately 1500 members and about 900 of these are employees of the railway.

If there was ever a time when it was good business to push the company section work it certainly is right now. We have been clamoring for publicity and proper public relations. We have admitted that some of the shortcomings of the industry have been due to a lack of publicity and education of the public. Now should it not be the most natural thing to begin our education at home? How can one possibly expect the public to know all about our business when many times our own men are not apprised of the facts. All of you have been acquainted with the statements from the patrons of your roads that certain things, like the operating details or policy, are not right and that your own employees agree with the patrons or are silent on the subject.

There is only one way to eliminate such a complaint and that is to educate the employees who hold the pulse of the public in their hands, so that the employee knows what is in the official mind as far as the policy of the company is concerned and what is required in other departments as well as his own. It does not matter how big the men are who are filling the upper positions, they cannot practically protect the company's interest with the people at large and it remains for the employee on the street, in the workshop and in the office to absorb some of the company's ideals as a preparation for answering public criticism.

This means that better-informed men must be produced for the subordinate positions. Are there any better ways to do it than by the company section? The report referred to the splendid work that is being done in Toledo. The fine spirit of co-operation and genuine good-fellowship that is being realized there is to be commended.

In the chairman's opinion one of the most important considerations in handling employees today is that of getting real human beings to occupy supervisory jobs. There are many bosses in many industries in this country that are not fit to handle men and they wouldn't get results at any wage.

Besides what the company section can do for the railway there is another important function in connection with the association. Company sections mean more individual members. An association without a flourishing, active membership cannot be very progressive. The individual members are what give the "pep" and the personality to the association work. It is they who determine whether the association is going to stand still, or develop into a real, virile useful organization.

The committee wants to urge upon every official to help the company section movement. If you already have a section just think what Toledo has done—increased its membership 400 per cent in the last year. Toledo has almost one-half of all employees in the company section. If the other companies would do what Toledo is doing the American Electric Railway Association could increase tremendously in power. The ELECTRIC RAILWAY JOURNAL has offered a beautiful silver cup for the section that starts out with the largest number of members. At present that cup reposes in Providence. Don't let it get tarnished. Give the employees of your property a chance to see it some day.

The committee report was signed by Martin Schreiber, chairman; W. J. Flickinger, H. Friede, H. H. Norris and Charles L. Redfern.

Prize for Best Company Section Paper

President Pardee announced that Alexander Jackson, superintendent of time-tables, Public Service Railway, had been awarded the medal for writing the best paper presented before any company section. The title of Mr. Jackson's paper was "Doing Your Bit." Mr. Pardee asked James H. McGraw, one of the members of the committee on award of the medal, to make this presentation.

In his presentation remarks Mr. McGraw commented upon the great value of the work which is being done by the company sections. He emphasized the thought expressed in Mr. Schreiber's report that the company sections offer a splendid opportunity for the education of employees and for developing a spirit of loyalty and team work. He expressed surprise that there are only twelve company sections and said there ought to be fifty; that there are only 2000 members and ought to be 50,000. "Service is the big word in this age," he said, "and it cannot be had without efficient management and loyal employees. Many of the papers which have been presented had been of great interest to the committee and had evidenced a knowledge which bespoke the splendid educational value of the company sections."

Mr. Jackson responded briefly by saying that he was proud to receive the award as a recognition of his endeavor to assist the industry in its time of stress. He lamented the lax methods which many employees follow in performing their duties and pointed out that present conditions demand closest attention and the utmost diligence.

The meeting was then addressed by Job E. Hedges, receiver, New York Railways. After which the meeting adjourned. Mr. Hedges' address appears elsewhere.

Wednesday's Session

The second session of the American Association convened on Wednesday morning in the Greek Temple with President Pardee presiding.

Valuation

In speaking of the report of the committee on valuation, which was the first order of business, President Pardee said that this was one of the most important matters before the association and spoke particularly of a public service commissioner who had read all the commission decisions on valuations to date and who had said his mind was much confused as to the principles involved.

The report was read by George Weston. It was printed in full in the issue of this paper for Aug. 2, 1919, page 222.

Mr. Weston said prior to reading the report, that the text refers to the importance of valuation for rate-making purposes and also discusses the fundamentals considered necessary to build property values.

P. J. Kealy, Kansas City, in commenting on the report said that it contained one or two radical steps, namely, that it considers only cost of reproduction new and allows no deductions for depreciation and secondly, that bond discount is not included in the value of the property. With reference to the first—the cost new less depreciated value was originally developed by the Wisconsin Railroad Commission and to the valuation thus determined was added "going value" to offset the amount of accrued depreciation deducted. This plan caused considerable confusion in attempting to show what was meant or included in "intangible values" with the result that street railway valuations including such items have been severely attacked. The Wisconsin Commission has now changed its principles and bases the return on the plan outlined in the report. The valuation in Buffalo followed the same principle and since the report of the committee has been published the Washington and Missouri commissions have accepted this theory as their practice. With regard to financing, the committee believed that this concerned the owner only and that it was immaterial whether or not the stock was sold at par or at a discount, providing discounts were amortized out of earnings. He also expressed appreciation for the untiring efforts of Mr. Weston for his persistency in pushing the work of the committee to a conclusion.

W. H. Sawyer, East St. Louis, said one particular phase of the report predominates as most commendable and constructive, namely, "reproduction cost new as of date of inventory undepreciated" and claimed that this plan was right and fair and that the committee or the association could take no other attitude and urged the companies to use the committee report as a Bible and follow the plans as outlined.

President Pardee announced membership on convention committees as follows: On the committee on resolutions, J. N. Shannahan, chairman; R. P. Stevens, L. E. Gould, B. F. Weadock and Edwin Gruhl. On the committee on nominations, John J. Stanley, chairman; J. R. Lovejoy, A. W. Brady, J. H. McGraw, L. S. Storrs, E. F. Wickwire and L. C. Bradley. On the committee on dues, P. J. Kealy, chairman; John G. Barry, Frank R. Coates, J. H. McGraw, C. L. S. Tingley, B. A. Hegeman, Jr., and W. H. Sawyer.

President Pardee called to the attention of the convention the full page advertisements appearing yesterday in the larger newspapers in and around New York, Newark, Philadelphia and Atlantic City, referring to the necessity of higher electric railway rates. He paid Mr. McGraw a fine compliment for his far-sighted publicity.

Federal Legislation

The report of the committee on federal legislation was presented by C. L. Henry, an abstract of which follows:

The sub-committee of the committee on national relations was appointed on June 28, 1919, to give attention to federal legislation affecting electric railways. Two meetings were held and in the interim W. V. Hill, manager of the Washington office, kept the committee fully informed as to all legislation affecting electric railways.

At the July 26 meeting the proposed plans of the Short Line Railroad Association were reviewed and it was decided to defer definite action until the introduction of the bill being drafted by the sub-committee of the Senate interstate commerce committee. The committee disapproved the proposed plan of the Short Line Association, of taking away powers now vested in state commissions and placing them with the I. C. C., taking the position that the business of the electric railways, being very largely of a local character, should remain subject to the jurisdiction of the local authorities except as to interstate business.

A number of bills were introduced in both Houses proposing varied plans for the return of the roads now under government control to their owners, etc., all tending toward vesting with the government enlarged powers of control through the Interstate Commerce Commission or other tribunals to be created. There is also what is known as the Plumb plan, which need not be commented upon, for it is believed that Congress will not give it very much attention.

The bills that are receiving serious attention are known as the Cummins bill (S. 2906) and the Esch-Pomerene bill (H. R. 4378, S. 1256). These bills involve electric railways, particularly interurbans, engaged in interstate traffic.

The committee, on Sept. 22 considered these two bills and unanimously decided that electric railways should be eliminated entirely from the provisions of the Cummins bill, excepting the sections that amend certain provisions of the commerce act. Amendments were drafted, accordingly, and submitted, with a letter of explanation, to Hon. Albert B. Cummins, chairman of the Senate committee, on Sept. 23. This letter reads in part as follows:

It is apparent that the purpose of Senate bill 2906 is to return the roads now under federal control to their owners. Very few electric railways are now under such control, and substantially all other electric railways should be excluded from the general provisions of this bill. There are, however, a few electric roads now under federal control and some few others desiring to be under federal control. If this is found desirable, they could be considered and classed with steam railroads in any legislation enacted returning railroads to private ownership. In such case a slight change in the amendments which we propose would be necessary.

The distinction between steam and electric interurban roads is well known and is constantly recognized by the courts, Congress, and the several state legislatures in dealing with the transportation question. Upwards of 60 per cent of all electric railway mileage in the country is strictly city mileage, and not to exceed 5 per cent of the gross earnings of all electric railways, city, suburban and interurban, is derived from interstate traffic.

No one will contend that city electric railways are to be classed, for purposes of operation, with steam railroads. The interurban electric railways are, to a large extent, affected by their local surroundings; they must depend largely upon revenue earned from local communities served, and they are affected to a greater extent by the competition of motor vehicles—they must be considered by themselves. Any attempt to fix general rates of fare for all common carriers would result disastrously to this industry, for passenger fares and freight rates must be considered with relation to the territory in which they operate. They are properly under the control of the Interstate Commerce Commission in all things relating to interstate business, but they should not be put under the various regulations and restrictions of the pending bill.

To have the wages and working conditions of electric railway employees under the jurisdiction of, and fixed by, a body that passes upon like questions for steam railroad employees can but be disastrous to the electric railway industry, for the action of such a body would be certain to be dominated by the ideas of steam railroad employees whose duties are very dissimilar to the electric railway employees, and would be likely to result in onerous burdens being placed upon the electric railways, possibly beyond the ability of the communities and companies to bear.

To carry out the ideas expressed the committee prepared and presented proposed amendments to exclude all electric railways from all the provisions of the pending bill except such sections as simply amend the interstate commerce law.

The Esch-Pomerene bill proposes to amend certain sections of the Palmer act which very materially increases the powers of the Interstate Commerce Commission, vesting with that body many of the powers now under the jurisdiction of state commissions. It, by its terms, included electric railways, and particularly all those engaged in interstate traffic.

Charles E. Elmquist, president of the National Association of Railway and Utility Commissioners, appearing before the House committee, offered amendments to Section 2, of this bill to make it unnecessary for electric railways to obtain from the I. C. C. a certificate of necessity for making extensions of lines and permits to abandon any portion of lines in operation; to Section 5, relating to pooling and consolidation of operation; to Section 17, requiring approval of the Interstate Commerce Commission of the issuance of securities. Mr. Elmquist took the position that authority to pass on questions of this nature should be left with the state commissions. The committee concurred in the views taken by Mr. Elmquist.

Members of the committee also conferred with Messrs. Esch and Sanders, of the House committee, leaving with them copies of the letters submitted to Senator Cummins, stating that these, reflected the views of the committee on any legislation pertaining to the general railroad problem involving electric railways. The committee was assured that its views would be given careful consideration by the committee before reporting out the bill.

Compensation for Carrying Mail

The report of the committee on compensation for carrying United States mail was read by L. H. Palmer in the absence of Chairman Curtis. An abstract of the report follows:

For a number of years past the electric railway companies have been endeavoring to obtain increased compensation for handling United States mail. As a result, partly of the representation made to the joint committee of which Senator Bourne was chairman, a law was passed in 1916 giving the I. C. C. the jurisdiction to establish rates of pay for the carriage of the United States mails.

Promptly after the passage of the 1916 act, the Interstate Commerce Commission after taking up the question of pay for steam railroads notified the electric railway companies that it would fix a date in the near future to take up their case in regard to mail pay, and on June 9, 1919, the commission commenced its hearings in Washington before Attorney Examiner G. N. Brown. The Post Office Department was represented by former Second Assistant Postmaster General Joseph Stewart, and the electric railway companies were represented by S. S. Ashbaugh of Washington, former counsel of the New Haven Railroad and for the Short Line Railroad Association in their mail pay litigation. Mr. Ashbaugh was assisted by Special Engineer Welsh of the association and by committees of railway operators selected by the association. F. W. Doolittle prepared the basis for the statistical evidence and the theory upon which the testimony was delivered.

Since the conclusion of the hearings on Aug. 4, 1919, the committee has prepared a brief for final presentation to the commission and also considered an oral argument which will take place at a date to be set by the commission after the briefs are filed. Much study has also been given to the formulation of rates for city and interurban service and for pouch and independent car service, although no conclusions as to the final rates have been reached.

The committee prepared definitions for city and interurban service and submitted them to the association for approval with the idea that they may hereafter be considered standard. These definitions are:

1. *City service* is defined to be that performed by cars operated solely within the limits of a municipality or from within the same, to adjacent suburbs at comparatively low speed. Such cars are usually operated without dispatching or signal systems. This service is construed to include what is called "Suburban Service."

2. *Interurban service* is defined to be that performed by cars operating between communities through rural districts at higher speeds than city service and under rules and conditions approaching more nearly steam railroad practice.

The Post Office Department, through Mr. Stewart, has asked for a conference, and a sub-committee consisting of Messrs. Curtis, Kealy, Tingley, Riddle and Palmer has been appointed to act with Mr. Ashbaugh at these conferences.

Inasmuch as the Post Office Department has been engaged so continuously in the preparation of the argument for presentation of its side of the steam railroad case, it has not been possible to hold this conference to date, and the committee recommended that it be continued in office for the ensuing year, in order to complete the work now in hand.

While progress has been made, the committee stated it was impossible to render a final report, but felt confident that results may reasonably be hoped for, as a result of the evidence introduced at the country-wide hearings.

C. L. Henry referred to the report as a most efficient and accomplished work and called attention to the strength of the association organization in that these hearings were planned and held coincidently with the work of the Committee of One Hundred.

S. S. Ashbaugh said that counsel for the Post Office Department in the argument of the steam railroad case before the I. C. C. had stated that side and terminal service was to be performed by the department, but as yet the exact date had not been set as to when this would take effect. Never, he said, did a case receive more loyal support than did the electric railway case and he urged the electric railways at this time to refrain from taking advantage of the plan to eliminate side and terminal service, until the commission sets a date for the steam railroads, and the association's committee presents its case, which would be submitted before the holidays.

Arrangement as Regards Manufacturers

Vice-President McCulloch took the chair to enable Mr. Pardee to speak with regard to the proposed plans concerning the manufacturers. He stated that the plan for an affiliated association had been abandoned and the proposed amendments to the constitution and by-laws amended so as to provide five members on the executive committee of the parent association. Such members to be nominated as usual and elected at the convention.

J. H. McGraw stated it was a very happy solution of the whole thing and personally believed that this was a red letter day in the history of the association. He urged that manufacturers be given a responsibility and said they would respond if such responsibility was put upon them.

H. C. Clark, chairman of the committee on changes in constitution and by-laws, read the report allowing manufacturers representation in an affiliated association and two members in addition to the president on the executive committee of the parent association. An amendment was offered by C. L. Henry so as to allow five manufacturers to be on the executive committee of the American Association and do away with the proposed separate manufacturers' association. The amendments as amended were approved unanimously.

The amendments as passed were as follows:

Sec. II. Par. (b). The president and vice-presidents shall be elected at the annual meeting of the association and shall hold office for one year or until their successors are elected. All such elections shall be by ballot, and a majority of the votes of all the company members present shall be necessary to an election. The secretary and treasurer shall be appointed by the executive committee. The offices of secretary and treasurer may be held by one and the same person; and the work of the treasurer's office shall be performed in the secretary's office.

Sec. VI. Par. (a). The entire charge and management of the affairs of the association shall be vested in an executive committee, which committee shall consist of the president, the vice-presidents, presidents of the affiliated associations, and five

others who shall be connected with member companies engaged in the business of manufacturing or selling materials for electric railways. The past-presidents of the American Electric Railway Association and its predecessors, the American Street and Interurban Railway Association and the American Street Railway Association, shall be honorary members of the executive committee, but without the power to vote.

Sec. VI. Par. (b). The five members of the executive committee representing manufacturer member companies shall be elected at the annual meeting of the association. All such elections shall be by ballot and a majority of the votes of the company members present shall be necessary to an election.

Engineering Standards

F. R. Phillips then presented the report on standards of the Engineering Association which stated that the Engineering Association is conducting a campaign to promulgate a more universal use of its standards and recommended practices, and is mindful of the fact that it will be somewhat difficult to arouse great interest in such prosy matters in view of the larger problems of finance and public relations which now engross attention. Nevertheless, it should be borne in mind that whatever plan may be decided upon as a solution of the great problem now before the industry to be successful it must include the economical operation and maintenance of the physical property. To this end the Engineering Association proposes to devote its energy. Uniform practice and standardization of parts lends itself admirably to the accomplishment of such purposes.

In the prosecution of this campaign the association is aware that standardization should not be carried to the point where it will in any way interfere with the progress and development of the art. Moreover, it is known that operating conditions and requirements in many respects are by no means identical throughout the country and any attempt to set up hard and fast rules of procedure and specifications to fit all conditions would be a waste of time and effort.

However, the number of devices and the variety of materials in common use among the railways is too large and the benefits which can accrue from the standardization of such items is great. The relationship between sensible standardization and economy is so close that the terms might be called synonymous. Standardization is necessary to the successful operation of the prime essential of low unit cost, known as "Quantity Production." It will effect a saving in operating costs through simplification of methods of handling materials in the storerooms; it will materially reduce the amount of money invested in supplies; it will produce economies in maintenance by reducing the investment in tools, patterns and machinery; it will accomplish a saving in overhead expense through a reduction in design and development charges in the engineering and maintenance departments; it will aid in producing more prompt deliveries of materials and supplies for the reason that manufacturers will be able to carry stock in anticipation of orders; it should be of immense benefit to manufacturers, since it will offer a means of bridging the gaps and leveling the demand peaks permitting a more stabilized output.

As an illustration of the efficacy of sensible standardization attention is called to the work of the Master Car Builders' Association and to the Institute of Electrical Engineers. Imagine if you may the undesirable chaos that would follow a substitution of practices embodying the individual desires of operating officials for the wonderful compendium of standards found in steam railroad practice. Furthermore, consider the remarkable and most commendable achievement of Automotive Engineers when in five days the standard "Liberty" motor was designed, thereby accomplishing in one stroke what otherwise might have required years, the production of motors in sufficient quantity to meet the war requirements of the government.

For fifteen years the Engineering Association has been engaged in standardization studies. When it is remembered that the electric railway industry has undergone rapid and radical development, its work deserves the unqualified support of our whole membership. What we seek is your co-operation and support. There has been put in your hands a pamphlet entitled "Why Use the Engineering Association Standards?" On the last pages you will find a list of our standards. Take the pamphlet home with you. Secure a Manual. Ask your department heads to come prepared to discuss the standards of the association at our or your staff meetings. If in your opinion these standards do not properly meet your requirements tell us all about it, suggesting the remedy.

In the association booth at the outer end of the exhibit hall you will find a number of devices and materials kindly loaned to us by manufacturers which represent in some part the standardization work of the association. Constructive criticism is solicited in order that we may more fully meet your needs and desires. The Engineering Association is worthy of your attention. It needs your active support.

Service-at-Cost Plans

The next subject on the program was "Some Features of the Service-at-Cost Plan." Two papers were presented, one by Walter A. Draper, Cincinnati Traction Company, describing the situation in Cincinnati and the other by R. P. Stevens, Mahoning & Shenango Railway & Light Company, Youngstown, Ohio, describing the conditions in that city. These papers appear in abstract elsewhere in this issue. It was announced that the paper on the same subject by J. E. Hutcheson of Montreal and the report of the Committee of One Hundred would be presented at the Thursday session.

A. W. Brady, Anderson, Ind., at the request of President Pardee, then spoke about some of the results obtained by the Committee of One Hundred. Mr. Brady said that he would not go into details of the work of the committee because that would be mentioned in the report, but those who have followed the case closely know that the position of the electric railways had never before been put before the country as clearly as it had been in the testimony presented. The trouble up to this time has been to get the public to realize what the real fault is, and it is hoped that the result of the Washington hearings will be to prove that the troubles are not local but general, and that the public utilities should have living wages just as other industries have. He spoke particularly of the debt of gratitude which the industry owed to General Tripp, President Pardee and others, who had given their time to the prosecution of this case.

Thursday's Session

The Thursday session of the American Association was called to order by President Pardee at 10 a. m.

Zone Systems

The first matter taken up was the report of the committee on zone systems, which was read by W. H. Sawyer, chairman of this committee. The large attendance and the marked attention that was given to this report showed the great interest that was being taken in the subject. An abstract of the report follows:

In this report the committee assumed that everyone appreciated that the net income of the average electric railway is now so inadequate as to constitute a menace to the future prosperity and the upbuilding of the resources of our country, as money enough is not available for the proper maintenance and continuance of past service, to say nothing of extensions, improvements and betterments.

There is no one cure-all or panacea for our existing ills as the details of the solution will vary in different localities. It is the duty of the industry to find the solution.

In general higher net revenue can be secured only in one or more of three different ways: Operating economies; substantial increase in revenue per passenger; substantial increase in number of passengers carried at a profit.

As to operating economies, street railway executives, operators and manufacturers have, ever since the advent of electric railways, been continually at work to effect such economies, and only because these have been taken advantage of that the electric railways for more than a generation have continued to exist on a 5-cent fare.

Present day illustrations of their efforts are the elimination of stops, the automatic sub-station, the light weight safety car, and power saving devices. Many companies have been unable to take advantage of these economy devices because their extremely low net earnings have ruined their credit thus preventing the obtaining of the necessary funds to put these improvements and economies into effect.

Attention is also called to one of the most just, equitable and fair ways to reduce the cost of service namely the elimination of paving costs and assessments. Operating expenses could also be reduced by elimination of all taxes, license fees, needless passes to city employees and other antiquated and discriminatory franchise requirements.

Under the present conditions where the bare cost of service is actually the controlling factor in either state regulation or municipal contract in fixing fares, there is real justification for eliminating all taxes on car lines just the same as is done for the patrons of municipal water works, highways, and other public improvements.

As to "increased revenue per passenger," the natural assumption is that the normal, logical way to increase revenue per passenger is to increase the flat rate fare to 6, 7, 8, 9 or even 10 cents. A review of the experiences of companies with horizontal increases in fares, demonstrates that there are positive limitations to the extent to which revenues can be increased by this method. Indeed, in many cases the possibilities of larger revenues from further increases in flat rates have been reached or at least closely approached. The loss in traffic, due to discouraging short distance riding may deprive the railway of a profitable class of business and raises the question as to whether it is possible to work out a practical system of fares which will still preserve an attractive rate for short distance riding, and at the same time increase the revenues of the company to the necessary extent. If the increased flat rate does not prove adequate in some localities, some other solution to increase revenues must be found. It is the duty of the members of this Association to go out of the beaten path to investigate other methods, to suggest and work out details and to force to attention new or other methods.

As to "increased number of passengers," this would naturally be assumed to include an investigation of zone systems. A zone system properly applied may also increase the average revenue per passenger and it is our belief that it will tend to encourage riding.

In discussing zone systems of fare collection it is most necessary that the terms used be defined, in order to eliminate confusion and misunderstanding, due to inaccurate terminology. With this thought in mind, the following fundamental definitions of terms as used in the body of this report are submitted:

A zone system of fares is one in which the fare varies with the distance traveled, and might properly have been called a "distance system."

A zone is one of the relatively short subdivisions of more or less uniform length, into which a route is divided for the purpose of fare determination.

Uniform rate zone system is one in which the fare is directly proportional to the number of zones traveled in or through, that is, one in which the fare per zone is the same in each zone, including the first.

Initial charge zone system is one in which the fare for the initial zone of any ride is greater than that for the succeeding zones.

Fixed minimum zone system is one in which a certain rate per zone is charged, with a definite fixed minimum fare, which minimum disappears when the sum of the zone charges exceeds it.

Central area zone system is one in which a flat fare or uniform charge, regardless of length of ride, within an established central area, is combined with zone charges on routes which extend beyond such central area.

The uniform rate zone system is a form which has been in use in England and other foreign countries for many years, and has apparently encouraged short-haul riding and improved the service load factor. It is most discriminatory in favor of the short-haul rider, because cost of service is not directly proportional to the distance traveled.

In many localities there is a distinct danger that the uniform rate zone system would result in lower gross and net revenue on account of the large percentage of passengers that may be carried below actual cost. One of the principal objectives of any zone system is that it encourages riding but great care must be taken that the short haul rider is not unduly or unfairly favored. It might be noted that in general the English tramways are municipally owned; discrimination is flagrantly practiced, and the rate of fare and length of zone are very largely based on what the traffic will bear, rather than upon what is fair and equitable to all classes of passengers. Furthermore, this system involves the maximum of fare collection difficulties, although it should not be condemned on that account.

It has been widely claimed that zone systems produce congestion of population. If this were true, congestion would be more highly developed in foreign cities using this form whereas in reality congestion is not found to any greater degree than in many of our flat rate American cities. The tendency, however, in European cities is towards a more even spreading of the occupied territory, rather than to the uneconomical, haphazard and spotted development so frequently found surrounding our cities; it is probable that the zone system has something to do with this, thus changing the sociological argument to favor the zone system.

The initial charge zone system definitely recognizes the principle of assessing "the cost of service" on each passenger including the "readiness-to-serve" cost. The rate may be based on a definite allocation of costs, or it may be modified as dictated by the presence of competition or other factors. As it unquestionably costs more per unit of distance to carry a short haul passenger, an equitable system of fares must recognize this fact. Competition or other factors might make it advisable to reduce or to increase the initial charge below or above the actual cost and conversely change the zone rate but actual costs should never be ignored in the consideration of the problem. The more nearly the initial charge represents the actual cost, the nearer is the approach to the equitable rate. On the other hand the short haul rider usually is a convenience rider and the discrimination in his favor may be advisable in some places. Fare collection, in connection with the initial charge zone system, presents practically the same problems as with a uniform rate zone system.*

The fixed minimum zone system has been used for years in fixing steam railroad passenger rates, and has been commonly followed by both interurban and suburban electric railways. This basis provides for a certain rate per mile,

* Earlier issues of the Daily announced the immediate inauguration of this system by the Connecticut Company, and the application of the Public Service Railway for permission to abandon a somewhat similar plan which has been in operation for a few weeks on its lines.

with a definite fixed minimum fare, which minimum disappears when it is exceeded by the mileage rate. In common with the uniform rate zone system the fixed minimum system is less equitable than the initial charge system, in that the "readiness to serve" cost is not equally included in the fare of each passenger, and practically disappears as a separate element in the rate. While all fares under this system do not approximate the cost of service as closely as under the initial charge system, they are more nearly equitable to the several classes of passengers than under the uniform rate system.

Fare collection in connection with the fixed minimum system differs from that of the uniform rate and initial charge systems in that the fares collected from all passengers coming within the fixed minimum are the same, while under the other two systems such passengers would pay varying fares depending on the distance traveled.

The central area zone system is essentially a compromise between a flat fare system and some other zone system. It retains the benefits of the simplified collection of the flat fare for a substantial proportion of the total number of passengers who take or complete their whole ride within the central area.

The central area system has been used in several instances, because it had been felt that a zone system of fare collection for fares applicable to dense traffic conditions had not been satisfactorily developed. With the development of a better system of zone fare collection, one of the chief reasons for the central area zone system diminishes in importance. The central area system would probably be considered by the public as the least radical change from flat rate. Where this system is considered, particular care should be exercised that the central area is restricted so that it produces its share of the necessary revenue.

There may be other applications of the above four forms of zone systems different from those described and several combinations of the above forms of zone systems might be made, but these four cover in general the principal practical applications. Any one of them means a radical change from the flat fare system prevalent in most American cities. All of them tend, if properly applied, to encourage the riding habit, but also tend to complexities in fare collection and registration.

Care should be taken that the lengths of the zones established in any of these systems are not so short as to involve excessive difficulties in fare collection or registration. The requirements of a successful scheme of fare collection are the same in connection with any zone system as with a flat fare system, but in addition, provision must be made against abuses by passengers in over-riding. To meet these requirements, except where the traffic is light, it will probably be necessary to furnish each passenger with some sort of an identification check showing the zone in which he boarded the car, and to collect his fare as he leaves the car. To care for the details of this operation, several systems of fare collection are in progress of development at the present time.

The greatest obstacle which has heretofore limited the application of a zone system to electric railway lines handling heavy traffic has been the problem of fare collection. The limitations imposed by fare collection requirements must be for the present at least a factor of prime importance in applying zone systems to urban properties, and any zone system which does not give promise of adequately protecting the revenues, without unduly affecting the speed of operation, should not be attempted. The developments in methods of collection and registering zone fares are dependent upon public co-operation, and the collaboration of operating officials and manufacturers of registers and other mechanical collection devices.

Your committee believes that the manufacturers will find it to their advantage to give the most careful study to the requirements which must be met and to the evolution or adaptation of their product to meet these requirements. In other words, we are stating that the zone fare collection and registration problem is not yet nor can it ever be solved as simply or satisfactorily as flat fare collection and registration. Distinct definite progress has, however, been made, and the problem to-day is not considered as serious as a few years ago. Wherever a zone system is applied which is reasonably satisfactory in other regards, we believe that the problem of fare collection need not occasion its abandonment. The history of the art shows that where engineers and manufacturers have been given an opportunity to design and apply a needed device in practical service, they have generally succeeded. From the manufacturer's standpoint the greatest obstacle to improvements in methods of collection and registration of zone fares is that the operators have not as yet had sufficient experience to determine their requirements. Experience thus far secured from zone systems in this country shows clearly the necessity for careful investigation and in each case the procurement of reasonably complete and accurate statistical records upon which to outline an equitable system and estimate the results thereunder.

The public, municipal authorities, and members of regulatory bodies should realize that the zone system as applied to American urban conditions is still in the process of evolution. Even when the greatest care has been exercised in the investigation preliminary to the formulation of a zone plan some measure of uncertainty as to the result of the plan is bound to exist. Unnecessary changes should be avoided, because they are bound to affect traffic conditions and create some measure of public irritation. The wisest policy is for public authorities to give to the companies a large measure of liberty in trying out proposed plans. After a system becomes effective, the results can be much more accurately determined and such changes as are necessary to protect either the public or the company can be made intelligently and without prejudice to the rights of any party in interest. If a liberal policy is pursued by the car rider and by regulatory bodies, and if the companies through the agency of this Association freely place at the disposal of the industry the results of their experience with zone systems, we are confident that the progress made in the solution of this great question, which is of such vital importance to all concerned, will be most helpful.

The public in many instances will object to a zone system as its application does not eliminate the fact that at least some riders will have to pay a higher fare than under the traditional flat rate. In many instances an application for a zone system will cause objectors to appear in opposition, with the usual complaint that while the company may be entitled to additional revenue, the zone system is not the way to secure this revenue, as it radically discriminates as compared with past flat fare practice. These excuses are not really valid objections to the application of the zone system in their particular locality. But are objections which may be raised and must be taken into account from a practical standpoint. So long as a company can secure a net revenue which is a fair return and will invite necessary additional capital, the company should, of course be willing to serve the public in the way it desires. The aim should be to please and satisfy all customers, or riders, but none of them can be really satisfied unless the necessary revenue to maintain and expand the service is received.

The committee distinctly appreciates that a zone system, at this time, is not applicable to all communities, and especially is this true in towns and smaller cities, but as yet sufficient experience is not at hand to justify the committee in setting definitely a minimum limit either in popula-

tion or length of haul where a zone system would not be applicable.

Your committee on zone systems recommends that where a flat rate of fare is inadequate most serious thought and study should be given to the various zone systems. It is the thought of this committee that where and when any zone system is contemplated the fact that the purchasing power of the dollar has decreased should be fully taken into account to the end that the minimum charge per passenger be not set too low. In view of the great importance of the zone system to the industry and the probability of numerous important applications of such a system in the next few months, it is the judgment of your committee that the Association should continue to give careful study to this problem in order that the results which are secured by various companies may be placed at the disposal of the industry.

The report was signed by W. H. Sawyer, chairman, and L. S. Storrs, R. P. Stevens, Thomas Conway, Jr., A. S. Richey, L. H. Palmer, C. L. S. Tingley, J. H. Hanna, J. F. Hamilton.

Discussion on Zone Systems

Following this report, Walter Jackson read a paper entitled "Zone Fares for City Railways." He said that even as late as a year ago the idea of a zone fare for city railways was strange to American electric railway practice, with the exception of the Milwaukee plan which had been instituted in 1914. In speaking of the complexity of the zone-fare system, Mr. Jackson said that no differential fare system could possibly be as simple as one where every passenger tenders the same rate of fare and gets no receipt of any kind. He described the system that is in most common use in foreign countries and outlined the advantages of simplicity.

The difficulty of fare collection, Mr. Jackson said, was closely related to the matter of complexity. He referred to the operation of the Glasgow Corporation Tramways, which were carrying the extraordinary number of twenty-five passengers per car-mile on one of their lines and said that the carrying of from fifteen to twenty passengers per car-mile on English roads was not at all extraordinary. He believed that the collection of a zone fare in America should be considerably easier than in England because our cars are arranged so that the passengers are all on one level, and our average cars seat fewer passengers.

In regard to how such a system would be received by the public, Mr. Jackson thought that it would not be received with disfavor, particularly if certain advantages to the traveling public were added at the time that such a system was introduced. He said that the argument that the zone fare is responsible for congestion in foreign cities is an erroneous one. Housing conditions in the older cities of Europe antedated the institution of their tramways, and as a matter of fact under a sensible zone system the citizen pays less rent to counterbalance any higher rate of fare and there is no unearned increment for the land owners. In referring to the advantages of any correct zone system, Mr. Jackson said that the advantages seem to outweigh any disadvantages or complexity and that such a system offers an opportunity of trying to secure both maximum revenue and maximum usefulness. In concluding Mr. Jackson said that there are a great many other things that could be said about the subject, but he hoped that the two points given would serve as an incentive to further investigations.

Following the paper by Mr. Jackson, another was to have been read by Thomas N. McCarter, describing the Public Service Railway's zone system, but as Mr. McCarter was unable to be present this paper was not presented.

A paper on the relationship of items of cost under pre-war conditions and today as prepared by F. W. Doolittle was read by Garret T. Seely, Metropolitan West Side Elevated Railroad. This paper is abstracted elsewhere in this issue.

The next paper presented was that on "The Collecting of These Costs from the Traveling Public" by J. D. Mortimer, North American Company, and read by Edwin Gruhl of the same company. Mr. Mortimer's paper is also reproduced in this issue. Following this paper a letter was read by Bion J. Arnold, Elgin & Belvidere Electric Railway, stating that when his men went on strike, Mr. Arnold assumed operation of the car and ran it on schedule until the men came back to work without any change in condition.

Committee of One Hundred

The report of the Committee of One Hundred which was to have been given on Tuesday by Chairman Guy E. Tripp, Westinghouse Electric & Manufacturing Company, was presented by Joseph K. Choate, J. G. White Management Corporation. An abstract follows:

The report of the Committee of One Hundred first cited the offer of President Pardee to the Federal Electric Railways Commission to present in behalf of the association and the industry a complete case as it appeared to the executives and operators of the properties, then the prompt appointment of the Committee of One Hundred, then the appointment by the committee of sub-committees on finance, information and service, presentation and recommendations.

In commenting on the work of these committees, General Tripp said that the committee on finance had not only provided the funds necessary for the work but had been of material assistance in arousing the interest of railway companies, the bankers and the manufacturers. Through the courtesy of the Electric Bond & Share Company, the services of W. J. Griffen were placed at the disposal of this sub-committee. The crux of the entire case was, of course, in the hands of the committee on presentation, which, as a preliminary to its work, prepared an outline, published at the time in the ELECTRIC RAILWAY JOURNAL. This outline was closely followed in the subsequent appearances before the commission. Bentley W. Warren acted as counsel, and to him was intrusted the actual presentation of the case to the commission. Mr. Warren was greatly assisted by Edward Gruhl of the North American Company and H. C. Clark of the association. The gathering of the statistical data, which were the most complete ever presented to a body in the United States, was possible because of the efficiency of the association's staff, and acknowledgments of indebtedness for assistance were made to Secretary Burritt; James W. Welsh; Stone & Webster; Ford, Bacon & Davis; Connecticut Company; Electric Bond & Share Company; J. G. White Company; Henry L. Doherty & Company; Hodenpyl, Hardy & Company; Republic Engineers, Inc.; Public Service Railway, and to the witnesses who appeared to present the claims of the association.

The work of the committee on information and service was to disseminate the information at the hearings. The information sent out was simply a summary of the testimony of witnesses, as much attention being given to those witnesses being called directly by the commission or directly representing the public as to those called by the association. The success which attended the committee's work was due in a large measure to the generosity of B. G. Collier, who placed at the committee's disposal the services of Lambert St. Clare and Perry Arnold. The Associated Press carried from 600 to 2000 words daily in 700 papers, the United Press 400 to 800 words in 750 papers, the International News Service from 500 to 2500 in 300 papers, and a very large number of special stories were sent out by the 300 special correspondents who made Washington their headquarters. Longer articles appeared in weekly papers. In addition the association published each day a

digest of the testimony at the preceding day's hearings, 55,000 copies of this report being printed and mailed each day. This digest, which ran about 6500 words or so, was sent to all members of the association, non-member companies, mayors of all cities of more than 5000 population, members of public service commissions, city officials other than mayors, labor unions, members of the investment bankers' associations, governors of states, members of Congress and the President and his Cabinet, as well as to a number of individuals in this country and outside of the United States. When the commission was not in session, the digest was published twice weekly, amplifying the proceedings before published. At the conclusion of the first three weeks of the hearings, the committee published and distributed some 60,000 copies of a pamphlet containing a summary of the striking points in the testimony of each witness. As a result of these efforts, editorial comment was carried by papers in practically all of the important cities of the country, and a perusal of these editorials is striking evidence of the value of the work of the electric railway commission in educating public opinion to the facts in the traction situation. The committee on information and service further extended its activities to include the preparation of material for pamphlets and circulars to be issued by the individual companies, and also the preparation of a series of car posters and car cards which carried some of the most interesting facts brought out at the federal hearings.

The committee on recommendations has kept in close touch with all the testimony, has held several meetings at which this testimony was discussed, and it exercised general supervision over the preparation of a brief which will be submitted by counsel of the commission at the conclusion of the hearings.

In conclusion the report said:

"Your committee believes that the benefits derived and which will be derived from the work of the federal commission on electric railways are of extreme importance to the industry and will many times repay the efforts that have been expended by everyone concerned in connection therewith.

"The publicity given to the situation has already had a beneficial effect. The country has been brought to a realization of the fact that the traction problem is universal and applies to all parts of the country and that it involves certain fundamental matters which cannot be solved by the companies alone and that the interest of the public in a proper solution is as great as that of the companies themselves. The national aspect given to the situation has to a large extent eradicated from the public mind the belief that the condition of local companies is due entirely to local causes, and the way has been prepared for the correction of specific situations through this education of the public to the knowledge of general conditions.

"The benefits of co-operation in public utility affairs and especially in the affairs of the electric railways has been illustrated by the success of the task undertaken by your Committee of One Hundred. We cannot too strongly urge a continuance of this co-operation.

"We believe that in this time of stress, when the future of the industry is at stake, co-operative action is absolutely essential and that the machinery already erected by the American Electric Railway Association affords an opportunity for further constructive efforts in behalf of the industry."

Comments on the Report

In commenting on the report, F. R. Coates, Toledo Railways & Light Company, said that the work of the Committee of One Hundred must be continued. In the past, he said, the railway operators have been too apologetic, but they must now stand up for their rights. The Committee of One Hundred has done an excellent work, and Mr. Coates suggested that either the committee or the association get out publicity material to the employees. He also urged that more effort be put forth to get every non-member company into the association.

George E. Hamilton, Capital Traction Company, Washington, said that there never was a time when dangers were more theatening and when the association should feel more confident due to its preparations. The Committee of One Hundred has done a big work, said Mr. Hamilton, and has carried this to a degree of efficiency which foretells wonderful results. It is now realized that the public must be educated, whereas in the past the public has, in fact, been miseducated. The electric railways must have the support and confidence of the public and the publicity work of the Committee of One Hundred must be carried on. Mr. Hamilton said that there is already a perceptible change in the attitude of the public and he attributes this to the publicity work of this committee. The association, he said, has placed itself in a stronger position than ever before. Defeat is impossible and the dangers will surely be eliminated.

An earnest tribute was paid to Philip Gadsden by H. G. Bradlee, Stone & Webster. He said that one of the first to recognize the national character of the electric railway problems was Mr. Gadsden, who for more than two years has devoted practically all of his time to this work. Mr. Gadsden was instrumental in the formation of the War Finance Corporation, worked with the War Labor Board, and the appointment of the Washington Commission was largely due to his efforts. "We owe Mr. Gadsden a great debt of gratitude," said Mr. Bradlee, "not only as street railway operators, but as public citizens." Referring to the Committee of One Hundred, he said that the work of organization, presentation and publicity has been wonderful.

W. H. Sawyer, East St. Louis & Suburban Railway, said that it was a pleasure to stand up and have a chance to say a word in commendation of the work of the Committee of One Hundred. The railway industry, he said, does not fully appreciate what this committee has done. Their work has proved indisputably what the national situation is today. The importance of the work of the committee cannot be overestimated, and this work, together with that which the association will do during the coming year, will place the industry again on a stable foundation.

The paper on "Are These High Costs of Service Likely to Develop Permanent Competition?" by L. H. Palmer, United Railways & Electric Company, Baltimore, was presented by the author. This was followed by an address by Brig.-Gen. George H. Harries, H. M. Byllesby & Company.

General Harries said that he had recently read an article by a newspaper correspondent who had taken a trip around the front, entitled "The Romance of War." In the speaker's opinion the romance of the war was shown by the fine spirit of the American Expeditionary Force. It is recorded of the Israelites that they were required to make brick without straw. The A. E. F. was not required to make brick, but if it had been and no straw was available it would have found 250 substitutes for straw. He told the story of a stevedore at Brest who was sick but worked hard for nineteen and a half hours without rest to unload food from an arriving ship, and of a cook without assistants who worked continuously for twenty-seven hours over a hot fire to provide food for 2200 men.

Speaking of his personal experiences in Berlin, he said that if the armistice had not been declared so soon the Germans would have had a better knowledge of the fact that they were beaten. He was in Berlin in charge of the American interests there when the beaten German army returned. The soldiers returned bearing banners and laurel wreaths and with bands playing "the Watch on the Rhine"

and other patriotic airs. It was a time when any of them could "watch the Rhine" only vocally, unless he had the written permission of a commanding officer of the Allies.

During the early weeks of General Harries' stay in Berlin the American officers were gazed upon with curiosity. Then the outbreak began between the Spartacans and the government. The Germans seemed to exhibit a wish to govern themselves without knowing how to do so. Then followed two weeks of gunfire in the Berlin streets, but it was rather tame gunfire. General Harries told the story of a French officer who wished to cross the street during one of these fusilades. He waved his hand when instantly the gunfire was halted and the officer crossed the street. Both Spartacans and government furnished "guards" for the protection of the American headquarters, and at one time guards of both parties were outside. The food conditions in Berlin at that time were not good. General Harries remarked that he had been obliged to live on other occasions on horse flesh. It was not bad, but he did not care for the sauce in which it was served in Germany. He also ventured the statement that there were more skin wrinkles in Germany in the square inch than in any other country in the world, caused when a waist measurement is reduced from 75 in. to 44 in. German methods may be good when applied to Germans, but they are certainly not good when applied to other nations. As an instance he said that some time after being in Berlin he received a letter from one of the government officers suggesting that he wear civilian clothes on account of the feeling in Berlin against Americans. General Harries replied that he is not accustomed to have Germans tell him what clothes he should wear.

Another instance mentioned by him was of a gathering of some 80,000 Germans one night on the "Unter den Linden" shouting "Kill Americans," "Down with Wilson." No violence was attempted, however. On another occasion there was a thoroughly organized demonstration of "Hate" before the American headquarters. Thousands of Germans marched by the headquarters in sections. Just after one section had passed it would stop. Then the paraders would look toward the headquarters with growling face and French fits but uttering no sounds. Then the section would move on and the next section would repeat the action. This lasted for some three hours.

In General Harries' opinion it is the general policy in Germany now to foment industrial trouble in the countries with which Germany had recently been at war. In this way, Germany believes it can gain a marked industrial advantage and also reduce the severity of the peace terms. It is in close harmony with Lenine and Trotsky and is bent on the domination of Russia.

General Harries said he should not talk about war to such a gathering, as utility operators are always at war. They seem to be between the "irresistible," in the form of increasing operating expenses and the "immovable" in the form of rates. Nevertheless, a defensive army is always a beaten army, and it is time the railways assumed the initiative and attacked. Information to the public is the weapon. Be sure, he said, that the employees are trained and ready, for they can do more damage than anybody else. Pot the sniper speakers and writers, send tanks after the machine gun men, hold the initiative and never let the other fellow get it. Shell them out with arguments that cannot be stopped. Get the initiative and hold it.

Reports on Dues and Resolutions

The report of the committee on dues was then presented by P. J. Kealy, Kansas City Railways Company. Mr. Kealy said that it is evident that some rearrangement of dues is essential. The committee recommends that it be continued in order to report to the executive committee, and if the executive committee concurs, it can prepare such changes as necessary to present to the next mid-year meeting of the association.

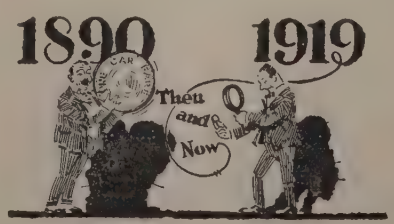
J. N. Shannahan, Newport News & Hampton Railway & Electric Company, presented the report of the resolutions committee. These included a resolution urging upon the public the necessity for fair and unprejudiced consideration of the electric railway situation to insure the collection and distribution of accurate information, and protect both the public and the industry against further damage by spreading of mis-information to the end that the necessary new capital may be obtained to provide the service demanded by the public. Further resolutions extended the thanks of the association to the technical press, to the chairman and members of the various committees of the convention, to the president, secretary and officers of the association, and recorded the sorrow of the association at the loss of those members who had been claimed by death since the last meeting of the association.

Election of Officers

The report of the nominating committee was presented by James H. McGraw. Mr. McGraw said that in presenting the names of the new officers, the committee had endeavored to take into account all conditions surrounding the industry and the fact that the greatest piece of work which has ever been done by any national public utility association has been accomplished during the past year. The year upon which the association is entering is the most critical in the history of the industry. The officers elected were:

President, John H. Pardee, Eastern Pennsylvania Railways; first vice-president, Richard McCulloch, United Railways, St. Louis; second vice-president, T. S. Williams, Brooklyn Rapid Transit System; third vice-president, R. I. Todd, Indianapolis Traction & Terminal Company; fourth vice-president, Philip J. Kealy, Kansas City Railways; and as members of the executive committee the officers, past-presidents and John G. Barry, General Electric Company; William S. Bartholomew, Westinghouse Air Brake Company; S. M. Curwen, the J. G. Brill Company; Thomas Finigan, American Brake Shoe & Foundry Company; B. A. Hegeman, Jr., National Railway Appliance Company.

Following the election of officers, President Pardee said that he had strenuously opposed re-election, because he had for ten years stood for rotation of office. He said that he had been prevailed upon against his wishes, and that the success of the administration during the past two years had been made possible only by the co-operation of all its members. He thanked the convention and said that he feels sure all members will continue to co-operate in the same manner during the coming year.



L. C. BRADLEY
President

Proceedings of the T. & T. Association

Notable Reports Were Presented at Atlantic City Meeting, Covering Principles of Traffic Regulation, Agreements for Joint Uses of Tracks and Terminal Facilities, Collection and Registration of Fares, and One-Man Car Operation—Safety-Car Film Prepared Under Auspices of One-Man Car Committee and Four Manufacturers Was Exhibited—Meetings Were Devoted to Discussion of Committee Reports—W. H. Collins Was Elected President

W. H. COLLINS
President-Elect

THE tenth annual convention of the American Electric Railway Transportation & Traffic Association was called to order on Monday Oct. 6, 1919, at 3 p. m. with President Bradley in the chair.

Secretary E. B. Burritt abstracted the annual report of the executive committee which covered the work of the association from the close of the 1916 convention. He called attention to the discontinuance of committee work due to the war and the new policy, followed this year, of having but one subject for consideration at each session. He also stated that the report of the convention would be printed in bulletin form and distributed to all members.

Secretary Burritt then presented his report as secretary-treasurer. This report stated the subjects assigned to committees for investigation and report at the convention; the work performed at the association offices and commented on the decrease in expenses due to companies paying the traveling expenses of committee members. The only expense now chargeable to the association was the cost of printing its reports and proceedings and minor expenses incurred at headquarters. Both reports were accepted as presented.

President Bradley's Address

President Bradley, in calling the session to order, stated: The Transportation & Traffic Association is twelve years old and meets today in its tenth annual convention. The conventions planned for the years 1917 and 1918 were abandoned because of the disturbed conditions produced by the World War. Hence the assemblage today is under conditions which represent almost a colossal change from those which obtained when, in Atlantic City on the evening of Oct. 12, 1916, the association adjourned its last convention.

When the Transportation & Traffic Association elected him president he promised there would be a good convention. If that prediction falls short of accomplishment, it certainly will not be the fault of the men who have served on the executive committee. They have engaged most earnestly in the work of preparation for the convention. They have attended meetings at great sacrifices of time which they could ill afford to spare with so many matters at home pressing for attention, and at great expense, when most rigid economy seemed everywhere essential. Mr. Bradley also expressed warm appreciation of the energies and devotion of the members of the special committees which have studied and prepared reports on subjects to be presented for consideration.

At former conventions it has largely been the rule to have presented for consideration a large number of subjects prepared by standing and special committees in addition to special papers on timely topics. This year a radical change has been made as but four subjects will be considered. The purpose of thus concentrating the efforts of the association is to enable the convention thoroughly to discuss the reports, to digest them properly and to obtain an interchange of views from all sections of the country. These subjects are: (1) code of traffic principles; (2) one-man car operation; (3) collection and registration of fares; (4) proper basis of compensation for use of city tracks.

The Future of the Industry

The permanency of street railway transportation, in some form, is unquestionable. That, from time to time, the art will be developed to cope successfully with every reasonable and just demand made upon it, is the confident belief of everyone who has studied existing conditions. In the train of a war which has disorganized, if it has not destroyed, economic order throughout the world, no doubt it is reasonable to expect many ideas and "isms," which are the outgrowth and off-shoot of pre-war or post-war conditions in Europe, will find their way into this country. From those countries, where there has been oppression and autocratic rule, these ideas, strange and out of keeping with free American principles of government, will continue to come to us. Municipal ownership is one of them. But municipal ownership is un-American. It is contrary to every principle of American government and has no place here.

The industry will continue under private ownership. The people will demand it upon a basis which will provide adequate service and at the same time compensate the owners for the money, skill, initiative and labor required to produce that service. But the management of this great industry, upon which urban population is so largely dependent in the pursuit of its daily avocations, will require and will receive, even greater brains and energy in the future than has been devoted to it in the past.

I repeat, the street railway business in America has fallen to the lowest ebb it has reached since it emerged from a disconnected chaos into a great national industry, and this is in spite of the fact that the executives of street railways have waged a fight to save the industry from that disaster, threatened constantly during the last few years, which excites the admiration of every man connected with this business. To be associated with such men fills one with a just pride. Their resourcefulness, their ability, their courage has been splendid. There is nothing in the annals of modern business to compare with the magnificent fight they have made and are now making. And for the reason that their cause is right, that it is just, that it is American, it is bound to win.

The saving of the street railway industry means not alone the salvage from threatened spoliation of billions of money invested, but it means the preservation to the people

who use them constantly and essentially in the routine of their daily lives of the systems of urban transportation which have been evolved through the years of street railway operation.

PROGRESS NECESSARY

But, there is more to the street railway business than its financial side. Important as that is, of scarcely less importance is the duty devolving upon those into whose keeping is given the responsibility for its daily operation. Coordination of effort all along the line is absolutely essential to the successful working out of the problems and difficulties which are everywhere present in the street railway industry.

It is not sufficient to pursue those policies and methods which heretofore have been deemed adequate and sufficient. The industry is constantly confronted with new problems, and to meet and master them requires the best that is in all operating officials! Nothing less will suffice. The stress of these times demands not only effort, but an elastic managerial policy, not only willing to welcome advancement in the art, but capable and resourceful in evolving improvements in practice and betterment in equipment.

New methods must be developed to meet the new conditions and successfully to overcome the new ordeals. Better ways and means of accomplishing the plans laid out are certainly essential to the life and salvation of the street railway business, as it is known today, and it is squarely up to those directly charged with operating responsibilities, to bring to bear upon the problems encountered all the genius and all the power they can command.

Efficiency, service and development should be the controlling trinity of all the operating men if they are to measure up to the example set along financial lines by the executives. And if this is done, I unhesitatingly predict, with the utmost confidence in that judgment, a new era in street railway transportation.

The finished product of the street railway is service. Demands for service are constantly changing. New difficulties are constantly arising. New and strange requirements are being made upon the management. To meet these it is essential that there be exerted not only herculean efforts, but an intelligence backed by a courage that knows no fear, to develop and adopt changes in method which will make possible the rendering of proper service. Improvement in operating methods, and by this is meant detailed supervision of all parts of the companies' business is essential to reach the standard required by the new conditions with which the industry is now struggling.

LIVE TOPICS FOR SETTLEMENT

Some parts of the business are being discussed at this convention by other affiliated associations. But within the category of the Transportation & Traffic Association several important phases of management should be brought to the attention of the industry.

1. *Traffic Regulation.* The committee on code of traffic principles will present to the convention a thorough and comprehensive study of this question. Street car service has gradually become the slowest of all paid means of transportation. To this condition there are many contributing causes, but the dominant one is street congestion. This is due to the rapid and enormous increase in the use of automobiles and the fast growth of American cities. A lack of uniform traffic laws and regulations, rigorously and impartially enforced, tends to place an insuperable handicap upon street car schedules.

2. *Skip Stops.* The skip-stop system, inaugurated during the war as a fuel-saving device, has demonstrated its value in increased speed in car schedules, time saving to the passenger and economy in operation. The efforts of the management of the industry throughout the whole country should be co-ordinated toward developing the skip stop, which certainly should be retained upon every street railway system in America.

3. *Safety Cars.* This subject will be presented to the convention in complete form. The four elements most essential to adequate street car transportation are reliability, speed, comfort and safety. Any development in the art of transportation which does not embody improvement in at least one of these elements is a step backward. The safety car combines not only one but all of them, and the industry has not yet fully comprehended its indebtedness to C. O. Birney whose skillful research and vision of future needs are embodied in its design. The possibilities of improved service, increased revenues and economies in operation which the safety car offers are so far-reaching that every electric railway official owes it both to the public and to the railway, which he serves, to become fully informed upon every phase of its design and operation.

4. *Collection and Registration of Fares.* The report of the committee on collection and registration of fares should receive wide and varied discussion. That, certainly, is one of the pressing problems of the day. It will be coupled with valuable data on fare boxes and prepayment cars.

5. *Energy-Saving Devices.* The experience of those companies throughout the country which have been foremost in the scientific and economical use of current, deserves careful study on the part of the industry.

6. *Traffic Checks.* There is nothing more necessary than a simple, complete and satisfactory system to record traffic conditions. Correct information as to the traffic at all hours and upon all parts of a system, is a condition precedent to economical, adequate and proper service. Service is the finished product of the business. It is the friction point of contact with the patrons. A thorough knowledge of the service rendered and the demands for that service are absolutely necessary to proper operation. Assuming that the riding public is willing to pay a fair charge for the service, without such checks and proper records how is it possible to know what is given, and if that service is adequate or is too much or too little? In all other departments of operation, in a well-regulated street car system, the management may have instant recourse to full information and accurate data. But seldom are the conditions of traffic, which service is designed to meet, so recorded as to be immediately available in determining the quantity and character of service best suited for the needs of those who use the street cars.

7. *Supervisory Force.* One of the present weaknesses in street car transportation in this country is the lack of an intelligent and properly trained supervisory force. Cooperation between municipalities and street railway companies in traffic regulation and other matters which interfere with reliable car schedules, will be of little avail unless the supervisory force is well trained and fully competent. The development of an efficient personnel is a constant and tremendous task; but without it very little progress can be made toward improvement in the one thing the public is most interested in—Service. Other departments engaged in supervision of street railway operation, in practically every case, are in the hands of a highly trained and intelligent personnel. Does the personnel of the supervisory force measure up to the standards of these departments? Certainly if efficient service is to be had the supervisory force must measure up to the highest possible standard. It is the direct point of contact with the public served, and service is the thing in which the public is most vitally interested. Whether a street railway undertakes to furnish a 4, 5, 6, or 10-cent service, it must be done with the same degree of efficiency and system as is employed in other phases of operation. The determination of the character and quantity of this service may not safely be delegated to

those without authority and who are not fully advised as to the company's financial status and all other problems affecting public relations.

8. *Employees' Welfare Work.* Attention is called to the importance of this work along lines calculated to make service of employees as nearly 100 per cent efficient as circumstances will permit. Different companies have varying methods of accomplishing this end. It is, however, recommended that the incoming executive committee consider this subject as one for presentation at the next convention.

9. *Accidents.* I understand the Claims Association is presenting to its convention information about every phase of the accident situation. Very little progress can be made by that association without the fullest co-operation on the part of the Transportation & Traffic Association. The rapid increase in automobile and vehicular traffic on city streets is creating a situation which threatens to become very nearly as serious as the lack of adequate revenue. The passage and enforcement of adequate laws regulating traffic is absolutely vital. The subject of accidents is an integral part of the special report of the committee on code of traffic principles which is being presented to the convention.

In closing President Bradley urged the importance of full and frank discussion on the floor of the convention, of all of the problems confronting the industry, for without such an interchange of ideas the convention would fail to accomplish its broadest and most important purpose.

Upon the completion of his address, President Bradley mentioned the appointment of the two usual convention committees and prior to the close of the session announced the following: As members of the committee on resolutions, H. B. Potter, Boston Elevated Railway; Arthur Gaboury, Montreal Tramways, and R. T. Sullivan, Mahoning & Shenango Railway & Light Company; and as members of the committee on nominations, L. H. Palmer, United Railways & Electric Company of Baltimore; Richard Meriwether, Dallas Railway, and J. N. Shannahan, Newport News & Hampton Railway, Gas & Electric Company.

Code of Traffic Principles

The next subject on the program was the report of the committee on a code of traffic principles, which was presented by H. B. Flowers,* chairman. The reading of the report was followed by an extended discussion.

In this report the committee endeavored to carry out the commission of the executive committee that there should be formulated a code of traffic principles which, bearing the indorsement of the association, can be used by companies to secure the co-operation of the public and municipal authorities, in the adoption and enforcement of such equitable rates and regulations governing vehicular traffic and the operation of street cars as will best serve the public interest. The attention of the committee was also directed by the executive committee to the study of traffic regulations presented in 1916.

In its report the committee stated that, having no precedents to follow, it had carefully studied the various traffic ordinances, and rules and regulations in effect in various cities and states. The result was the discovery of a lack of uniformity and of intelligent effort in most cases to draw up ordinances that were of real benefit to the traction companies. The rights of the street railways were not recognized, and the importance of regulations on streets on which there are car tracks has not as yet been shown. However, there has been some effort in some communities to improve conditions by enacting traffic ordinances which in a measure do recognize these rights.

The committee prefaced its report with a general historical statement and outline of fundamental principles, leading up to a tabular statement of these, preceding the announcement of the proposed code itself. The principal points made were the following:

Community growth and prosperity depend so largely upon transportation that regulation of street traffic has long been one of the most important governmental functions. At the same time traffic congestion and other conditions have made street railway transportation the slowest of all paid means of travel.

Misdirection of public opinion, which has proved so costly to the street railway company generally, has nowhere been felt more severely than in traffic regulation. Speed limitations, frequency of stops, promiscuous parking of vehicles, lack of standardized signals or rules of the road, are daily creating in every community where street railways run a congestion of traffic, costing the electric railways untold sums. The people who must meet this cost through their carfares should be brought to realize that it is a needless and wasteful cost.

Many of the larger cities in framing their traffic codes or regulations are now expediting the operation of street cars in many ways. A study of these codes shows a uniform attempt to keep the car tracks open for street cars; to insure safety of passengers while boarding or alighting, and to facilitate in many small ways the safe and regular operation of cars. It ought not to be difficult for the industry to show officials charged with the making of traffic regulations that further regulations equally favorable to the operation of street cars would work further benefits to the public at large.

Cities which have recognized the necessity of keeping vehicles off the car tracks, and of providing for safety of car riders should be asked to recognize still further the dominant right of the street car in the streets and the necessity of providing for the public convenience as well as for the public safety. No one class is entitled to the exclusive use of any streets, nor should there be discrimination against any user of any street, save as the needs of other users make such discrimination in the public interest. Street cars carry the bulk of passenger traffic. That fact should be recognized in all regulations affecting traffic in which street cars are a part.

Analyzing the traffic situation of communities generally, the committee sifted out what it considered the fundamentals for a successful code of traffic principles, and developing and applying these proposed a code as follows:

1. The growth and prosperity of any community is dependent on its means of transportation and communication with other communities.

2. From an economic standpoint, the greatest utilization of highways as a means of intercommunication is essential.

3. Highways are primarily for the use of the public; first for vehicles of all classes, moving and standing; second, for pedestrians.

The rights of each must be clearly defined, and must be respected by the other and to obtain the fullest use of the highway, the closest co-operation between the general public, the electric railways and the civic authorities is absolutely necessary. Municipal or state governments, automobile associations, civic or trade bodies and cartage companies are equally interested with electric railways in promoting safe and quick passage through city streets, and a successful traffic ordinance can be efficacious only as it has the co-operation of all.

4. To obtain the greatest utilization, regulation of traffic thereon is necessary so as to insure safety and quick dispatch and to avoid congestion.

5. Regulations must be founded on the basis of the greatest good to the greatest number. No one class is entitled to the exclusive use of any street nor should there be discrimination against any user of any street, save as needs of

* An earlier issue of the Daily announced Mr. Flowers' appointment to the general managership of the United Railways & Electric Company, Baltimore, Md.

the user make such discrimination a matter of public interest.

6. The need for standardized regulations and their enforcement, especially on city streets, should be realized by all, as the present variations in regulations or lack of them, with the resultant confusion and congestion is daily costing large sums of money, which is felt first by the electric railways, but which is ultimately paid by the general public through increased cost of car fares and through slower transportation.

7. The need for established and well-defined routes for parades, and the hours when parades shall be permitted, which will least interfere with the operation of street cars is apparent, so as to eliminate disarranged schedules with the attendant inconvenience to the traveling public.

8. The need of an enforceable ordinance eliminating causes for delays at steam railroad crossings, and at other points by the loading and unloading of heavy machinery, etc., so as to reduce delays, and the further disarrangement of schedules must be met.

9. Courtesy of the road should be recognized as the foundation of traffic safety and regulations.

WHAT THE REGULATIONS SHOULD COVER

1. Streets should be classified according to importance and physical characteristics: (a) Congested districts; (b) one-way-travel streets; (c) restricted traffic streets; (d) parking and non-parking streets; (e) other restrictions (residential districts, important intersections, public buildings, locations, fire, police houses, schools, hospitals, etc.).

2. Use of streets should be clearly divided and defined, both as to character of traffic and the rights of each user: (a) Pedestrian and vehicular; (b) weights—capacities—speed of vehicles; (c) right of way—superiority of street users; (d) obstructions in streets; (e) established safety zones.

3. Regulation of traffic, moving and suspended: (a) Pedestrian travel should be defined for safety from and non-interference with vehicular traffic. At intersections, pedestrians, should move with, not against vehicular traffic. (b) Vehicles: (a) In motion. Procedure when meeting, passing, intersecting, stopping, following, turning out. Rights of different classes of vehicular traffic. (b) Motion suspended: (1) Street car stops should be fixed in number and so located as to facilitate—not impede—traffic. (2) Vehicles standing should be limited in time and location. (3) Vehicles parking should be limited as to time and place, and rules for limitations should be explicit. (4) Vehicles stopping, should signal, stop on right side, close to curb in such a position as not to impede traffic; at street intersections, should stand at building line, not at curb. At street car intersections, should not stand within — ft. of intersection; should not stand in front of entrance to any public building, or within — ft. of any fire plug.

4. Signals and Signs: (a) Drivers should use standard signaling system proposed by Automobile Association of America. (b) Signs should be conspicuous, fixed and concise. (c) Lights to be carried by all vehicles, and headlights dimmed.

5. Enforcement (a) By authorities. (b) Penalties—(1) for violation of specific provisions; (2) for carelessness.

The committee calls attention to the fact that the above is a skeletonized code, submitted in this form so that its essential members could be considered and the effect of their functions estimated. To draw a model ordinance following the proposed code it is necessary to write into the text a description of the detailed conditions of the municipality adopting it. In preparing an ideal traffic ordinance the municipalities, railway companies, automobile clubs, and various mercantile industries must co-operate. An ordinance to be efficacious should be designed to correct two obvious weaknesses in traffic laws existing in the various cities at the present time. These are lack of reasonableness in the provisions of the ordinance and the great difficulty which is experienced in enforcing even the reasonable portions of the automobile law concerning parking.

The committee report concluded with some typical rules and regulation governing street traffic, as formulated in Chicago, Philadelphia and Baltimore. An appendix also included the following table of vehicles in the United States, based on the report of the National Automobile Chamber of Commerce for 1919, the data being derived from the licenses issued by the several states.

TOTAL NUMBER OF MOTOR VEHICLES IN THE UNITED STATES

	Passenger cars	Commercial cars	Total motor vehicles	Population	Number of persons per pleasure car	Number of families per pleasure car
Dec. 31, 1914	1,574,431	136,907	1,711,338	98,781,324	62	16
Dec. 31, 1915	2,240,229	205,435	2,445,664	100,399,318	44	11
Dec. 31, 1916	3,243,631	301,321	3,544,952	102,017,312	31	8
Dec. 31, 1917	4,643,481	442,478	5,085,959	103,635,306	22	6
Dec. 1, 1918	5,352,350	593,092	5,945,442	105,253,300	19	5

Dec. 31, 1918, total motor vehicles 6,146,617.

REMARKS.—Figures are based on separate registrations of commercial cars in sixteen State and estimates of number of commercial cars by secretaries of State in five States.

Source of information: "Facts and Figures by and for the Automobile Industry," published by National Automobile Chamber of Commerce, April, 1919.

This report was signed by H. B. Flowers, chairman, A. Gaboury, Paul E. Wilson and J. H. Stephens.

DISCUSSION ON TRAFFIC CODE

In speaking of Chicago's traffic problem, J. V. Sullivan, Chicago Surface Lines, pointed out that the anti-parking ordinance has been in effect about two and one-half years and has improved the traffic conditions in the central business district. The section pertaining to parking of vehicles provides that no vehicle shall be permitted to stand on any public street where cars are operated, in the central part of the downtown district, between the hours of 7 and 10 a. m. and 4 and 7 p. m., for a longer period than necessary to load or unload its occupants, baggage or merchandise. Another ordinance, applying to the central or "Loop" district, provides a penalty for persons who permit a vehicle to stop within loading zones, 100 ft. long, established at eighteen important intersections, provision being made, however, that one vehicle at a time may stand within these areas while actually loading or unloading. The city code also prohibits the standing of any vehicle in the Loop district continuously in one place for more than thirty minutes during the day—the anti-parking ordinance, however, superseding this along car line streets during the rush hours.

To understand the necessity for drastic traffic regulations in Chicago, Mr. Sullivan said that it would be worth while to picture the conditions affecting the movement of the cars, particularly in the congested district. The congested district is limited to an area of about 1 mile radius, in each direction, and it has been estimated that more than 1,000,000 persons use these downtown streets every day. About one-fourth of the entire surface lines traffic is carried into or out of this district. A traffic census taken by the city authorities in 1915 showed that street cars constituted less than 15 per cent of the Loop district traffic movement during the day, and inasmuch as the number of motor vehicles has practically doubled since that time it is very likely that the cars are responsible for an even smaller proportion of the congestion.

The street railway system spreads out like a fan from this district with eleven bridges, three tunnels and three streets as railway exits. Two other exits are used exclusively by other vehicles. All exits excepting the tunnels are seriously congested by vehicular traffic, most of the bridges

having narrow roadways, on which only one row of vehicles can pass in each direction. There are also steep grades at the approaches. The use of other streets as exits is prevented by railroad occupancy or the absence of bridges. Some 600 surface cars leave this district during the maximum half-hour of the evening rush.

The evening peak load of commercial vehicles begins to recede about the time the heaviest car service is entering the central district, and if it was not for this, a hopeless jam of vehicular traffic would tie up these exits. However, these conditions are responsible for an unusual difference in speed of cars as between the congested area and the free-running territory outside. A summary of traffic delays over the entire system in March, 1919 (consisting only of those interruptions which called for emergency wagons), showed time lost amounted to more than 305 hours.

A typical narrow street used by important lines in the Loop district is 38 ft. wide from curb to curb. The space taken by cars passing on two tracks is 19 ft. 2 in. When automobiles are standing at each curb, the clearance on each side is only 3 ft. 5 in., which means that all other vehicles must use the car tracks. A study of this situation revealed a proportion of twelve vehicles to one street car. Efforts were made to reserve the car tracks in the central district for the exclusive use of cars, but this attempt was defeated by a showing that vehicles had no other roadway because the space alongside the tracks was usually occupied by parked automobiles. This led to prohibiting parking on car line streets during the rush hours.

In answer as to whether this relief was effective the city's Department of Public Service conducted a traffic study of the time used by approximately 85 per cent of the street cars in passing through the Loop district both before and after the adoption of the "anti-parking" ordinance. It was found that the aggregate time saving between the hours of 4 and 7 p. m. amounted to about eighty-three and one-half hours daily.

The average time saving per car during each half-hour period between 4 and 7 p. m. varied from 3.7 minutes between 5 and 5.30 p. m. when the greatest number of cars were entering the Loop, to 0.3 minute from 6.30 to 7 p. m.

In general, the "anti-parking" arrangement made for a much better movement of pedestrians, vehicular and street car traffic. Congestion along streets between intersections was greatly reduced and this had a marked effect in facilitating the traffic movement at street intersections.

The enforcement of this law did not proceed without opposition. Men working in the big office buildings had their chauffeurs call for them, and when they got down to the street, a traffic officer was likely to greet them with a notice to appear in court the next day. This ordinarily meant a fine of $5, and while there were few second offenders, the number of those who were forgetful even once was sufficient to crowd the court calendar for many months. There have been repeated efforts to change the law but so far it has withstood all attacks. The results shown from its operations have been such as to make for better transportation facilities if street cars actually had exclusive use of the tracks built and maintained for their movement.

W. C. Culkins, director of street railways in Cincinnati, said that traffic ordinances should be considered from the viewpoint of the car rider and that such ordinances affected the entire community. Delays to cars by vehicular traffic cause loss of patience and time to car riders as well as increasing the cost of operation due to motormen running on resistance.

In speaking of existing traffic rules Mr. Culkins stated that most of these had been worked out by auto clubs and merchants' associations which did not consider the public that had to be hauled through such districts. Heretofore the street railways have not taken a very active hand in traffic regulations. He believed that the committee had launched something that will result in much good, for city councils usually visualize only the outside of a car and do not see the passengers. Another evil that requires attention is the enmity existing between truck drivers and motormen, with the result that neither will give way to the other. In speaking of parking automobiles on sides of car track streets so that moving vehicles must run on the railway strip Mr. Culkins stated that it is necessary to educate the car rider to understand it is for his benefit that the street railway is working in trying to get a clear right-of-way. In conclusion Mr. Culkins expressed the belief that the committee had not gone far enough but should draft a model ordinance.

N. H. Brown, New Orleans Railway & Light Company, said that a traffic ordinance had been placed in effect in his city a few months ago which materially improved the freedom of passage of the cars, through the creation of one-way streets, elimination of parking during certain hours, etc.

Richard Meriwether, Dallas (Tex.) Railway, said that while his city was much smaller than those previously mentioned in the discussion, the traffic conditions were nevertheless acute and chaotic. He said that Texas has one automobile for every five people and described the manner in which the cars passed through the central business district. No traffic ordinance has been passed in Dallas, but one has been prepared which is now before the commission for its first examination. This prohibits parking on the three main streets during the entire day, it having been the thought that it was not practical to exclude parking during certain hours only, for this practice required so many policemen to enforce it. He said that a skip-stop system had formerly been in operation there but had been removed for political reasons and that the speed was reduced 10 per cent by the change back to the old system. Mr. Meriwether also called attention to the great value of through-routing cars as a means of eliminating congestion and avoiding duplication of service on the central business streets. A recent rerouting plan in Dallas had brought about through-routing of every line.

C. L. S. Tingley, American Railways Company, emphasized the thought that traffic regulations should be introduced from the point of view of doing the greatest good for the greatest number of people. He referred to the intense hatred existing between truckmen and motormen and said that the truckmen often deliberately delay the street cars because of this personal feeling. He believed that if these men were brought to an understanding of the fact that it is not the company nor the motormen that they are causing to suffer, but the great public, that this might serve to bring about a relief from this kind of traffic obstruction. Mr. Tingley also expressed the view that there was no more reason why the principal streets of a city should be used for a garage than for a carhouse.

Arthur Gaboury, Montreal Tramways, said that at present there is no traffic ordinance in Montreal, but one is now being worked out. He mentioned the problem which the city has had in the past of handling 125 to 130 in. of snow, and how the street car track has been the thoroughfare for all classes of vehicles under such weather conditions. This difficulty had been eliminated by an arrangement whereby the city and company co-operate to clean not only the right-of-way but the entire street, the city sending out its snow-removing equipment immediately after the sweepers, so that vehicular traffic is enabled to drive elsewhere than in the track. In order to make sure of this, the company undertakes to clean the snow off for a distance of 8 ft. outside of the track on either side.

R. T. Sullivan, Mahoning & Shenango Railway, Youngstown, pointed out that as the street congestion increases,

this not only delays the movement of street cars but also delays the automobiles. He said that conditions were coming to the point that the streets were too small to carry all of the traffic, and that this must lead to the use of the most efficient means of transportation. The street car might be looked upon as the means which would best serve this situation. He thought that the code as drawn up by the committee should be wonderfully helpful.

H. B. Potter, Boston Elevated Railway, told how traffic congestion had been alleviated in the shopping district in Boston where the streets are practically filled with pedestrians, by eliminating automobiles from these streets between the hours of 9 a. m. and 5 p. m.

At this point, Mr. Gaboury read a resolution which was seconded and carried, to the effect that the committee should be continued and instructed to draft a model traffic ordinance and mail it to all member companies for comment.

The meeting was then adjourned.

Tuesday's Session

President Bradley, on calling the association to order on Tuesday afternoon, explained the way in which the safety car film prepared under the auspices of the T. & T. Association had been produced through the kindness of the General Electric Company, Westinghouse Electric & Manufacturing Company, J. G. Brill Company, and Safety Car Devices Company, and said that public appreciation ought to be expressed for that work. He then introduced C. W. Kellogg, chairman of the safety car committee.

One-Man Car Operation

Mr. Kellogg presented an abstract of the report in part as follows:

Your committee feels, after its study of the subject, that the topic assigned to it represents the most important improvement in street railway operation that has been brought out in the last decade.

Our investigation indicates that the subject of one-man car operation naturally divides itself into two fundamentally different cases:

1. The mere rearrangement of existing two-man cars so that they can be operated by one man, thus saving platform expense, and, if equipped with safety devices, making an improvement in accident cost.

2. The creation of an entirely new type of car of low weight, greatly improved safety, and more rapid acceleration and deceleration. This car of the light-weight safety type not only saves platform and accident expense, but permits an improvement in service, such as well nigh to revolutionize the street railway business.

The operation of street cars by one trainman in small communities where small gross per car-mile demanded the utmost economy in operating expenses, is not a new idea in the street railway business, the practice having been followed for years by many of the smaller companies; but the modern light safety car represents a radical improvement in the whole art of urban transportation and, therefore, will be the principal topic discussed in our report.

The jitney was what produced the light safety car. The popularity of the jitney proved beyond a possibility of doubt that frequent, quick service would get passenger business away from the slow and infrequent street car, and it was up to the street railway industry to develop light cars that would simulate jitney service. Following this idea, Charles O. Birney designed the car that now bears his name. It was realized that the car must be light in order to accelerate quickly and that it must be operated by one man in order to compete with the jitney which was similarly manned. The safety devices followed from the realization that the public would not patronize the car unless it was convinced that it took no more chances in doing so than with the two-man car.

The new car, weighing only 13,000 lb. and seating thirty-two people, had to be designed from the bottom up—wheels, axles, truck, body and motors were all radical departures from previous practice and the automatic safety features alone were a triumph of adaptation to the compelling forces which led to the development of the new car. In general, these safety devices consisted of ways to make the operation safe in case the operator dropped dead, or slackened in attention. The "dead-man's handle" required that the operator have his hand constantly on the controller or it would throw off the power. Similarly, if the power were so thrown off, the brakes would be automatically applied and sand fed to the track, and, when the car came to a stop, the doors, previously held securely closed by air pressure, are made available for manual operation to form emergency exits if desired. All of these points will be clearly shown in the moving pictures that have been taken in connection with the committee's report.

The committee desires to emphasize the importance of the safety devices in one-man operation. We are advised that practically all of the cases of unfavorable action by the public or public bodies against one-man car operation have been where no safety devices were installed on the cars.

In order to support our own opinions with the largest possible reinforcement of opinions of those engaged in the business, questionnaires were sent out to all member companies. These questionnaires were prepared after a full committee meeting and cover all phases of the subject. The companies replying numbered ninety-three, representing 1,123 one-man cars. It was found, in general, that more than half of the companies reporting were 100 per cent one-man operated, and that 41 per cent of all cars of the reporting companies were one-man operated.

The total number of light safety cars in operation in the United States at the present time, allowing for deliveries which will be made up to the time this report is presented, is 1,100. The number under order and in process of manufacture is 600—among the latter an order for 200 for the Brooklyn Rapid Transit Company. The total number of one-man cars, including safety cars, in use in the United States is somewhat more than 2,000.

Replies to Questionnaires

Power Consumption.—Companies using the safety car report an average reduction in energy consumption per car-mile of 51.2 per cent. Taking 3 kw.-hr. per car-mile as a fair average for most city systems, this means a saving of about 1.5 kw.-hr. per car-mile. Actual figures from forty-five companies show energy consumption of safety cars ranging from 0.8 to 1.75 kw.-hr. per car-mile as a fair average for most city systems, and this means a saving of about 1.5 kw.-hr. per car-mile.

Trainmen.—Replies showed that the operator of a one-man car was paid more than either trainman in two-man car operation by 62.5 per cent of the companies answering the question, the range being as follows:

Number of companies	Cents per hour additional
1	1
10	2
5	3
13	4
1	4½
10	5
1	7
1	8
1	7½
1	10
Average	4

As to the feeling of the trainmen toward one-man cars the replies showed:

Favorable	83
Unfavorable	10
Per cent favorable	89.2

The same ratio was reported as to opposition by trainmen to the inauguration of one-man car operation, the opposition being classified as seven, due to labor union feeling, and three due to apprehensions of the men as to the difficulty of accounting. Only two companies out of forty-five report the trainmen disliking the safety cars.

In answer to the question as to whether or not trainmen had been assured they would not lose their jobs due to the starting of one-man operation, thirty-nine companies reported that they had made this promise, forty-two that they had not.

The Public.—The attitude of the public toward one-man cars when started was reported as friendly by eighty-four and unfriendly by fifteen. This latter number was changed to four after a trial of the cars themselves, thus resulting in a final public verdict of 96 per cent in favor of the one-man cars.

The action reported by public bodies toward one-man cars was as follows:

Cases of favorable action by city commissions	10
Cases of favorable action by state utility commissions	11
Instances of defeat of proposed unfavorable state laws	3
Refusal of city council to pass prohibitory bill introduced by labor	1

Only two unfavorable acts by public bodies were reported, one by a district court and one by a city commission, but in these cases, the safety car was not at issue.

Regarding the question of fare collection with one-man cars replies showed no difficulty or not any change from conditions with two men in eighty-eight cases, and the three companies reporting difficulty said it was only to a limited degree.

Schedules.—The replies to the questions under this heading had to be clearly distinguished as between light-weight safety cars and converted one-man cars, because the latter could not, of course, expect to effect any change from their former schedule.

Regarding headway, the average increase in number of cars operated on lines using safety cars was 43.7 per cent.

Similarly, with schedule speed this was increased an average of 14.76 per cent with the safety cars, thus making an average increase in car frequency of 58.46 per cent.

As to lay-over time, more was found needed by twelve companies, but no additional needed by seventy-five companies.

As indicating the wide range of adaptability of safety cars, headways from one minute to thirty minutes were reported.

Earnings.—The wonderful success of the safety car in building up traffic was indicated by the answers to these questions. Of course, with converted former two-man cars, no effect in increased earnings was observable. The average for the six companies using safety cars which were the most successful shows the following:

Gross per car-mile before one-man car operation, cents	21.11
Gross per car-mile after one-man car operation, cents	20.65
Decrease in car-mile gross, per cent	2.3
Increase in car-miles operated, per cent	53.4
Increase in total gross earnings, per cent	51.1

In one city of 125,000 population, an increase of 79 per cent in car mileage on lines where the safety cars were operated produced an increase of 71.2 per cent in total gross earnings from the lines in question.

The replies as to the effect of light safety cars in eliminating jitney competition do not make a very impressive showing statistically, partly however, because in a large proportion of the companies reporting no such competition existed, but nine companies report complete and two companies partial elimination of this competition through the use of safety cars.

Operating Features.—Various degrees of accident reduction were reported by forty-seven companies and no such effect noticed by twenty-two. It is significant to observe in this connection, that the number of companies operating one-man cars without any safety devices is twenty-four.

On car maintenance, the replies were necessarily inconclusive, due to the comparatively brief time the safety cars have been in operation, but six companies report a reduction of 50 per cent in car-mile maintenance cost with safety cars and others predict various savings in the future. Naturally no saving in car maintenance can be secured where the former two-man car was simply rearranged for one-man operation.

A saving in the cost of track maintenance was predicted by fifty-two companies. Two large systems advise that they propose a reduction of 20 per cent to 30 per cent in rail weight if safety cars are standardized on in the future.

The acceleration of safety cars in miles per hour per second as compared to the average car on the system showed:

Average car	1.67
Safety car	2.53

Regarding flagging railroad crossings, the consensus of opinion appears to be that greater safety is obtained where the responsibility rests on one operator than where, as is the usual practice, it is in effect divided between two trainmen, with the proviso, however, that where the view from the car is obstructed, a flagman is desirable.

Distribution.—That the application of safety cars is not to be restricted to unimportant operation—light traffic lines, etc.—is shown by the following table indicating the use of such cars based upon the population of respective cities.

Population	One-Man Cars	Safety Cars
25,000	272	27
25,000 to 75,000	422	178
75,000 to 150,000	367	167
Over 150,000	96	59

Conclusions.—The answers to the general question of whether the experience with one-man car operation would lead the company to favor the extension of its use, show the following striking results:

Extension favored by	76
Extension not favored by	2

WHAT SAFETY CARS CAN SHOW

In order to indicate clearly the effect to be expected from the results already actually obtained by street railway companies, from the use of safety cars, the following typical example has been worked out.

PRESENT CONDITIONS

Length of route, miles	4
Average speed, miles per hour	8
Cars operated	6
Headway, minutes	10
Gross per car-mile (5-cent fare), cents	25

CONDITIONS WITH SAFETY CARS

Average speed, miles per hour	9
Cars operated	9
Headway, minutes	6
Increase in car-miles, per cent	66⅔
Gross per car-mile, cents	24

The safety cars can be purchased on the basis of 20 per cent cash and the balance in equal monthly instalments with interest at 7 per cent on deferred payments covering a period of five years. The average annual charge then becomes:

One-fifth of purchase price of $6,000	$1,200
Interest (average per year)	170
Average per year for five years	$1,370

The showing then becomes as follows:

Earnings:	
Present 315,210 car-miles per year at 25 cents	$78,802.50
Future 525,350 car-miles per year at 24 cents	126,084.00
Increase in gross earnings	47,281.50
Expenses affected by changes:	
Annual cost of cars—nine at $1,370	$12,330

Power:
Present: 315,210 x 3 = 945,630 kw.-hr.
Future: 525,350 x 1.5 = 788,025 kw.-hr.
Saving: 157,605 kw.-hr.
At 0.8 cent for fuel = $1,260.84

Trainmen's wages:	
Present: Twelve — eighteen hour men at 45 cents	$97.20
Future: Nine — eighteen hour men at 50 cents	81.00
Daily saving	$16.20
Per year, 365 x $16.20=$5,913	
Accidents:	
Present: 5 per cent of $78,792.50	$3,939.63
Future: 2½ per cent of $126,084.00	3,152.10
Saving	$787.53
Car maintenance:	
Present: 3 cents x 315,210 car-miles	$ 9,456.30
Future: 2.1 x 525,350 car-miles	11,032.35
Increase	$1,576.05
Total increase in operating expenses	$5,944.68

RESULTS

Increase in annual net earnings from the use of safety cars on the line. $41,336.82

This result is secured:

1. While paying out of operating expense the investment in new cars to do the work.
2. While giving the patrons of the line 66⅔ per cent increased car frequency and 12½ per cent increased speed.
3. Without any allowance for the savings in track maintenance from operating a 13,000-lb. car as against a 35,000-lb. car.
4. While *increasing* the *net* earnings per mile of track per year for the line (estimated as double tracked) by $4,580 or 6 per cent on a track valuation of $76,500 per mile of single track.

CONCLUSIONS AND RECOMMENDATIONS

1. The safety car is one of the most important improvements in street railway service that has appeared for many years. Its valuable features in the order of their importance are:

(a) Greatly improved service to the public, both as to frequency and safety.

(b) Increased earnings for the company.

(c) Decreased operating expenses.

2. One-man operation alone, while useful in saving platform expense in the smaller communities is not comparable with the improved service that can be obtained with the light-weight safety car with its more frequent headway and greater average speed.

3. The savings obtainable from one-man cars should be shared with the trainmen in the form of a higher hourly rate for the operators of such cars than is paid to the trainmen on two-man cars.

4. When inaugurating one-man car service, it is good policy to assure the trainmen that no one will lose his job due to putting in the new cars. They are installed, as a rule, a line at a time, and experience has proved that the company is not burdened with extra men through this policy.

5. From the nature of the traffic available, the safety cars can accomplish more in a large city than in a small one, for the reason that the possibilities of increasing riding in the small community are limited. This statement is made to correct the erroneous impression existing in some minds that the safety car is useful only for saving expense in the smaller cities.

6. Where traffic is believed to be too heavy on peak to be successfully handled by safety cars, the larger, heavy cars may be used for tripper service on peak, thus making the light cars handle the long hour runs.

7. Similarly, where snow storms require the use of the heavier equipment at rare intervals, the safety cars can still be used to advantage during other times.

8. The safety car, though light, is just as substantial and with the same care in maintenance should last just as long as the former types of car. It has a steel frame and thoroughly modern, ventilated, interpole motors.

9. Regarding the matter of standardization, your committee was not unanimous, but the majority opinion favored adhering to the present standard design of the safety car in the interest of cheaper costs through quantity production.

10. Experience has shown that the overwhelming majority of both riding public and trainmen favor the one-man safety car; that it can, at one and the same time, improve the public's service, increase the trainman's wages and raise the company's profits; that it can be purchased without financing and operated for about half the cost of an ordinary car; and that most of the companies that have tried it want more. We predict an increasingly rapid extension of the use of a device that can make a showing like the above.

The report was signed by C. W. Kellogg, chairman; S. W. Greenland, J. K. Punderford, J. M. Bosenbury, J. C. Thirlwall, C. H. Beck and Clarence Renshaw.

DISCUSSION ON THE SAFETY CAR

Following the presentation of this report, the safety car film was shown on the screen. Interesting features of the film were explained by Carl H. Beck, Westinghouse Traction Brake Company, who said that the film had been prepared to demonstrate that the cars were suitable for operation in large cities under heavy traffic conditions, that they were entirely safe, and the method of entrance and exit appealed to the general public. Special written contributions on the subject were then presented by J. C. Thirlwall, General Electric Company; G. H. Clifford, Fort Worth; P. J. Kealy, Kansas City, and Gardner F. Wells. These are grouped together elsewhere in this issue as a symposium on the safety car.

G. A. Richardson, now of the Philadelphia Rapid Transit Company but formerly of Seattle, then gave some interesting figures of the Seattle operation, with safety cars. Accidents have been greatly reduced, and he was impressed with the difference in viewpoint on this question taken by managers now and at the last (1916) convention. Now, the reduction of accidents from the car is taken as a matter of course. In Seattle some of the lines had severe competition from jitneys, but as a result of safety car operation, jitneys were completely put out of business on one or two lines and on the other lines they doubled their fares and gave a *de luxe* class of service. The same was true of Pacific Coast cities where the safety cars had been installed.

E. M. Walker, Terre Haute, Ind., was then asked to speak on the cost of maintenance. He said that as a result of eleven months of operation with an average of twenty-four cars out of thirty owned, during which the cars had carried 5,000,000 passengers, fear of excessive maintenance had disappeared. The company had separated its cost of maintenance for safety cars and for two-man cars, and had found that for the period mentioned the total maintenance cost had been only 13 mills per car-mile, or somewhat more than one-third of that for the two-man cars for the same period. On the safety car the cost of maintenance of equipment was only from 9 to 11 mills, so that if it should double it would not be large.

F. D. Norviel, Anderson, Ind., asked as to the adaptability of the car for single-track lines in small cities, where the turnouts were located 1½ miles apart, and where there was a great difference in travel between the rush hours and the off-peak hours.

J. M. Bosenbury, Peoria, Ill., said that the conditions in Quincy, Ill., were similar to those mentioned, yet all the equipment used was of the safety car type, and I. B. Walker, of Philadelphia, said that cars were operated on the Folsom division of that company which is equipped with single track. There during the morning and evening peaks, amounting to about four hours a day, cars are double-headed, giving an increase of 100 per cent in seats. He mentioned another line near Philadelphia which has two zones, with pay-enter in the first first zone and pay-leave in the second, also operated with one-man cars. On one single-track line the turnouts originally were such as to permit a ten-minute service, and when safety cars were introduced there was an increase of 10 per cent in traffic. Then the turnouts were increased so as to permit of a six-minute service and the traffic increased about 40 per cent. In speaking of the one-man car for all kinds of service, he

said that on one of these cars on one of the lines the company had carried as many as 107 passengers.

In answer to a question as to the suitability of the cars for cities having severe weather conditions, C. C. Curtis, Sydney, N. S., said that his company had had no trouble after Root scrapers had been installed. He did not think heavy snow in winter should deter a company from using safety cars, if otherwise they were desirable. It was foolish to drag heavy double cars around for twelve months in the year because two or three heavy snowstorms were expected during the winter. The proper remedy was to put on proper snow-fighting equipment. J. C. Thirlwall said that at Bangor, Me., some heaters had been added, but no other changes had been made in the safety cars, and the satisfaction given was indicated by the fact that the company had ordered fifteen more cars.

In answer to a question by a delegate as to whether the older platform men could learn to operate the cars as easily as the young men, considerable testimony was adduced that the cars were very popular with the older men. Mr. Beck cited one case in Bridgeport of a man who had been a motorman for fifteen or sixteen years and had never been able to qualify as a conductor on a two-man car but now was giving good service as an operator on a safety car. C. D. Smith, Youngstown, said that on that road the older men were choosing safety car runs. Another delegate said he had found the older men better operators because they were more careful. Walter Jackson then gave some recent figures on Terre Haute operation from testimony which he had presented before the Federal Electric Railways Commission at Washington. These figures will be found in the report of these hearings in this number.

In answer to another question as to whether the same additional number of old cars were not put in service the same increase in traffic would result, Mr. Kealy said that would undoubtedly be the case, but the expense of their operation would terminate the industry. Mr. Kealy then moved that as safety car operation was no longer an experiment, the report of the committee should be accepted with thanks and the work of the committee terminated. This motion carried and the meeting then adjourned.

Wednesday's Session

The session on Wednesday afternoon of the Transportation & Traffic Association and of the Accountants' Association was held jointly at the Greek Temple and was devoted to the subject of the registration and collection of fares. President Bradley presided.

Collection and Registration of Fares

The session opened with the report of the committee on the collection and registration of fares which was read by W. J. Harvie, chairman.

This committee prepared a progress report on what it considered as fundamentals in the matter of fare collections for various rate systems proposed for electric railways.

The executive committee instructions were to prepare a report on collection and registration of fares, giving consideration to the difficulties presented in the collecting and registering of two or more coins for one fare. The subject comprehends not only the collection and registration of 6- and 7-cent fares, for flat-rate systems, but the handling of zone fares and also the consideration of the use of metal or paper tickets.

No attempt was made by the committee to discuss the collection and handling of transfers, this subject having been exhaustively treated by previous committees of this association.

The subject was divided into two major parts, the flat-rate system and the zone system, and two combinations.

The report is predicated with an outline as follows:

1. Flat rate covering entire system, usually urban, using: (a) Single coins; (b) multiple coins; (c) coins and paper tickets; (d) coins and metal tickets.
2. Zone system, where fares are based on length of haul.
3. Central area having flat rate with distance or zone basis beyond.
4. Collection of fares in prepayment or post-payment areas.

For the purpose of properly understanding the terms used by the committee, definitions for "flat-rate system" and "zone system" are given:

1. A flat-rate system is based on a uniform charge within an established area regardless of length of ride.
2. A zone system is a system in which the fare varies with the distance traveled and might be properly called a "distance system."

(NOTE) To accomplish this the unit of distance must be short and the unit of fare low, but neither should be so small as to involve excessive difficulties in fare collection or registration.

The committee gives, as shown, a comprehensive summary of the existing methods of fare collection, which should be of much interest to those at present considering the many phases of fares and fare collection.

EXISTING METHODS OF FARE COLLECTION—FLAT-RATE SYSTEM

(A) *Using single coins.*

The plans for collecting fares of this character naturally divide into two classes, namely:

1. Mechanical collection. (a) Registering fare box (stationary); (b) non-registering locked fare box (stationary); (c) portable registering fare collector; (d) portable non-registering, locked fare collector.
2. Hand collection with registration.

(B) *Using multiple coins* (same methods as under A).

Substitutes: (a) Metal tickets alone; (b) paper tickets alone; (c) combinations of multiple coins and either metal or paper tickets.

(C) *Using paper tickets covering full fare.*

1. Mechanical devices used: (a) Locked box; (b) cancelling machine.
2. Hand collection and registration.

(D) *Using tickets for reduced rate of fare* (same method as under C).

EXISTING METHODS OF FARE COLLECTION—ZONE SYSTEM

Through Collection.

Duplex methods in use being hand punching and tear check.

Ticket systems in use being through tickets locked fare box with punched ticket, registering fare box with identification check and registration devices.

Multiple Collection.

I. FLAT-RATE SYSTEM

The committee believed that hand collection on closed cars with registration, which is subject to so many discrepancies, should be eliminated entirely and that all collections should be by mechanical registering devices, except where paper tickets are exclusively used, so that the proper fare may be collected and accounted for prior to the time it passes into the hands of the conductor.

Mechanical Collection—Single coins (*See A in outline*).

Multiple Coins (*See B in outline*).

There are several methods of making collection by mechanical means, and irrespective of the method followed it is believed:

(a) That all fares should be registered.

(b) That all fares should be collected at a given point in the car, whether pay-enter or pay-leave, with a registering collection device at that point, such device to be either portable or stationary. (Note exception.) This recommendation cannot be applied to certain types of present-day equipment, such as cross-bench open cars.

Multiple Coins versus Metal Tickets or Paper Tickets.

The committee did not believe the time opportune to make a final recommendation covering the use of either metal or paper tickets as a substitute for multiple coins. It recognized the value under many conditions, however, of the use of metal or paper tickets to facilitate the collection of fares, and for the convenience of passengers, and where used believed that metal tickets would be found to be more preferable to paper tickets for the following reasons:

First. The life of metal tickets approximate that of coins, whereas paper tickets are not legitimately usable in payment of fare after once collected, making the ultimate cost of the former less than the paper tickets.

Second. They are as flexible in use as a coin.

Third. Metal tickets can be sold practically as easily as paper tickets if bound together or if sold from a suitable coin change maker.

Fourth. Registration is easier to accomplish as metal tickets are adaptable to fare boxes of all types.

Fifth. The handling and accounting is less expensive and simpler for the reason that they can be handled as money.

Tickets, irrespective of the type used, should be sold from or at company offices and stations and at outside agencies, so that sales by conductors on cars can be reduced to a minimum. Under such conditions, one hundred per cent use of tickets is most desirable, but multiple coins should be accepted when the passenger presents the exact fare.

In making change for a passenger, if metal tickets are in use, one ticket for each fare to be paid should be included in the change given to the passenger.

The committee, however, feels that where coins are used, the locked box is less desirable than a registering device, due to the fact that the locked box requires that change must be furnished conductors and also that the cost of accounting is more expensive and requires a larger clerical force.

Paper Tickets—either for full fare or reduced fare (See C and D in outline).

Where paper tickets are extensively used, whether it be for full or for reduced fare, it is desirable to use a locked box to safeguard the tickets collected.

If collection is made by hand, it should be with registration, but as stated the committee believed that this method should not be used on closed cars.

Reduced Tickets (See D in outline).

In cases where reduced fares carrying a fraction of 1 cent are effective the committee recommends that metal tickets be used in preference to paper tickets.

Open Cars.

The collection of fares on this type of car needs special treatment, depending on the type of car, rate of fare and on other operating conditions.

II. Zone System

Under a zone system of fare collection, the present methods which are applicable to interurban roads, such as those based on mileage, have not been studied by this committee, inasmuch as these systems have been in use for a long time and they seem to be adequate for that class of service.

By "zone system," as referred to in this report, it is intended to refer to collection of fare where the service embraces more than one so-called fare zone, the total collection as made, being proportionate, in a greater or lesser degree to the distance traveled.

The committee believed that the duplex methods generally employed are not entirely satisfactory for a zone system in urban districts or those having heavy suburban traffic, where the entire fare collection is handled manually by the conductors.

The registration devices of various types in use at present for zone systems do not provide an adequate check on the collection of fares, because of the possibility of passengers over-riding.

Devices are now being developed, contemplating the issuance of an identification check when the passenger boards the car, settlement to be made when he leaves the car. These plans appear to us to be an improvement over the above systems, and also over the English practice. The latter provides for the passenger paying full fare to the conductor after boarding the car and receiving an identification check showing the fare paid. The success of this system depends on occasional open inspection by men boarding the cars for that purpose.

It is possible that the new devices referred to previously in this report under zone systems, may be worked out to take care of the problems under this heading.

In addition to recent articles that have appeared in the technical press, attention is called to the recent excellent reports of the Public Service Railway Company on a proposed zone system for that property.

Multiple Collection.

This plan of collection can be applied to suburban or interurban systems as well as to urban systems. Fares in this case are collected either by a portable collector or by hand. The committee did not recommend this character of fare collection except in cases where the trip originated in an urban zone of heavy travel and passed into an outlying district.

III. Fare Collection in Central Flat Fare Area with Zone Basis Beyond

The methods listed under A1 and A2 are applicable under this heading, used either along or in combination as circumstances dictate.

The recommendations of the committee as to mechanical methods would apply to the central area.

As to the zones beyond the central area, a portable collector should be used except where operating conditions preclude.

It is also practicable to use a combination of the pay-enter and pay-leave fare collection systems to meet the conditions coming under this head.

The committee could not recommend a definite zone system which would be applicable to all places under the conditions herein considered.

IV. Collection of Fare in Prepayment of Postpayment Areas Before Boarding or After Leaving Cars

There are three methods in use for this type of fare collection, namely: (1) Chopping box. (2) Motor-driven registering fare box. (3) Turnstile.

The committee recommended that for all classes of traffic of this character, the turnstile, as the most efficient and accurate method.

The first four conclusions reached by the committee are equally applicable for use on the "safety car."

Where the transfers are sold for cash and collected as a "fare," the simplest and most satisfactory way is to account for them on the basis of the number sold, *i. e.*, charge the issuing conductor with the number taken out when he begins his work, and credit the number he turns back when he finishes. For turnstile operation, if cash

passengers were also handled at the same location, a separate turnstile could be used for transfer passengers.

CONCLUSIONS

By way of summary the committee stated:

First. That hand collection in general be eliminated.

Second. That all fares be registered.

Third. That all fares be collected at a given point in the car with a registering collection device.

Fourth. That where tickets are used, metal tickets are preferable to paper tickets.

Fifth. That for prepayment or postpayment areas, turnstiles be used.

The committee suggests that in view of the systems now being developed, that this work should be carried on further in connection with a committee of the Accountant's Association.

The report was signed by W. J. Harvie, chairman, T. C. Cherry, C. W. Stocks, L. D. Pellissier, E. C. Spring, R. R. Anderson.

At the conclusion of the report, a discussion of the use of metal tickets by J. F. McLaughlin, Houston Electric Company, was read. This is abstracted elsewhere.

George Kuemmerlein, Milwaukee Electric Railway & Light Company, also read a paper on the subject. It will be found elsewhere in this issue.

DISCUSSION ON FARE COLLECTION—VIEWS OF MANUFACTURERS

Following the presentation of these addresses, Mr. Bradley said that he would be glad to hear from manufacturers on the subject and called upon John F. Ohmer, Ohmer Fare Register Company, as the first speaker.

Mr. Ohmer commented first upon the recommendation of the committee for the use of turnstiles in prepayment and postpayment areas and recalled that his company had exhibited a turnstile for cars at two previous conventions many years ago. Five or six years ago twenty-one cars had been equipped with this device at Dayton, and had operated for ninety days. Mechanically, the device was all right and on July 4 the conductors had collected from an average of 2000 passengers per car. Finally, some people protested to the city authorities but they declined to order a change. Another protest was made to the railroad commission, which finally asked the company to remove the device. The speaker thought that there might be a possibility for the device on cars at present, and that in view of the present financial situation of the companies the authorities would be more considerate. Plans are under way to try the turnstile in a city in Indiana. Speaking of devices for zone fares, Mr. Ohmer said that his company had designed a zone register, which seemed to meet the approval of a number of the officers of the Public Service Railway, but as he was not able to turn out a large quantity inside of five or six months, nothing further was done in that case. The Ohmer Fare Register Company had also developed a ticket-printing machine.

W. P. Butler, Johnson Fare Box Company, the next speaker, commented on the desirability of having the railway men outline their needs so that the manufacturers would not be obliged to develop the machines for which there would be no call. He suggested that a committee of the association might be appointed to discuss with the manufacturers what was wanted. He expressed himself as an advocate of instantaneous registration and spoke of a machine which his company was developing to register three kinds of tickets as well as coins. It was also giving its attention to the zone system. The cost of some of the modern registering devices might seem large when compared with the earlier and simpler forms, but if they were accurate they would soon pay for themselves.

W. P. Shaw, Cleveland Fare Box Company, was opposed to the separate registration if fares were deposited in a locked box and delivered to the counting room, as experience has shown that a conductor should have but two things to do—avoid accidents and see that a passenger deposits his proper fare in the fare box. Metal tickets, he said, were objectionable and easily counterfeited and their intrinsic value should be greater than their fare value to prevent counterfeiting. He also explained the system of fare collection worked out by his company on various suburban lines having multiple fare collections.

John Benham, International Register Company, said that metal tickets should be substituted for multiple coins in flat-fare systems and that registering fare boxes should be used in preference to locked boxes without a check registration.

C. D. Trubenbach, Perey Manufacturing Company, believed that turnstiles should be used on the cars and stated that his company had developed an automatic machine operated by the passenger.

R. R. Anderson, Rhode Island Company, advised that the Rooke register was used in Providence to good advantage.

George F. Rooke, Rooke Automatic Register Company, said it was his aim to have the passenger become a part of the fare transaction with the conductor before the coin leaves his hand, and that in keeping the conductor busy it keeps him alert. He claimed that the Rooke register turnstiled the money and not the passenger, thereby accomplishing the same result, an accurate check of the fares paid.

W. F. Kaynor, Waterbury Button Company, said metal tickets could be made to outlast the coin of the realm and to prevent counterfeiting they should bear a facsimile signature.

OTHER VIEWS ON FARE COLLECTION

W. A. Doty, Denver Tramway, said that metal tickets in connection with multiple coin fares are essential to the work of the conductor in that they eliminate making so much change. He disagreed with the committee in not providing for sale of tickets by conductors in lots of five, even when cars are equipped with registering fare boxes.

W. C. Sparks, Rockford & Interurban Traction Company, which uses registering fare boxes, said that metal tickets were sold at the company's offices and on the cars in lots of nine for 50 cents, whereas the cash fare was 6 cents. The Illinois Commission estimated that their use would amount to 75 per cent of all revenue fares. Actual experience shows less than 40 per cent.

A. Swartz, of the Toledo & Western, believed that 6-cent fares when paid with two coins slows up the loading of prepayment cars and that metal tickets covering the full fare should be sold. Registering fare boxes are being installed and their use is producing an increase in revenue.

J. W. Glendenning, Michigan Railway, stated that under the 5-cent fare with six tickets for a quarter, 56 per cent of the fares was paid with tickets. With 6-cent cash fares and full fare tickets but 30 per cent use was obtained, whereas with 6-cent cash fares and five tickets for 27 cents, 56 per cent of passengers used them.

L. H. Palmer, United Railways & Electric Company, said that where fares were increased from 5 to 6 cents an agitation arose for a metal ticket. Such tickets were placed on sale at 140 different places but not on the cars. At first from 7 to 10 per cent of fares were in tickets, but later this dropped very materially. With the 7-cent fares and four tickets for 26 cents or two for 13 cents, about 65 per cent use is obtained. Relative to zone fares he believed that passengers should pay for the ride received and that he had been advised the zone system in New Jersey was fast improving as the the people became familiar with its workings.

M. W. Glover, West Penn Railways, commented on the use of registers with fares boxes, especially with locked boxes; on multiple fare lines.

P. L. King, San Antonio, stated that on his property it was found to be impossible for the conductor to ring up all fares as deposited in the fare box and as a result the separate registration of cash fares was eliminated. Conductors, however, were given to understand that passengers must deposit their fares in the box.

L. R. Nash, Stone & Webster, expressed the belief that passengers not presenting the correct fare should pay more than the regular fare so as to offer an inducement to have their fare ready when boarding cars.

Walter Jackson, Brooklyn, said that the real reason why zone fares based on British practice would not work in this country was on account of the heavy loading of cars. He suggested that zone fares could be collected on the prepayment plan if a machine was used to issue a destination check, leaving a duplicate locked up for the company. This would give the conductor an incentive to collect the fares.

Thursday's Session

President Bradley called the final meeting of the Transportation & Traffic Association to order at 3 o'clock Thursday afternoon.

Joint Use of Tracks and Terminals

The report of the committee on joint use of tracks and terminal facilities was presented by the chairman, R. T. Sullivan. An abstract of the report follows:

The committee on this subject reported that it had divided its assignment: "The proper basis of compensation to city companies by interurban companies for the use of city tracks and terminal facilities, and proper traffic regulations relating thereto," into two phases: (1) The proper basis of compensation to city companies by interurban companies for the use of city tracks and terminals, and, therefore, the proper basis of compensation of interurban companies by city companies for the use of interurban tracks. (2) The proper traffic regulations, and contract obligations of each company to the other relating to such joint use of tracks.

The committee endeavored to determine the factors which go to make up an equitable arrangement—not only to the communities served, but also to the companies directly involved in the contractual relation. In such arrangements public benefit must be duly considered, as the development of a community through proper transportation facilities is closely interwoven with the development of the city and as well as, but to a lesser degree, its suburbs and the neighboring towns. In some states, this has resulted in statutes regulating the conditions upon which cars of one company may be operated over the tracks of another, while in others such regulation is vested in the utility commission or municipal authorities.

Whether or not the negotiation of such agreement lies solely within the jurisdiction of the contracting companies or is subject to established law or regulatory supervision, a multitude of considerations are involved bearing on what constitutes an equitable agreement. In no two cases are these considerations identical, with the result that it might be deemed impractical to attempt to define terms of a standard contract, or a group of standardized contracts cover varying conditions on various properties.

The majority of contracts involving the joint use of facilities provide for the use of city tracks, by interurban lines as comparatively few interurban lines have sole access to the centers of population and business activity. Interurban lines being of much more recent development reach the heart of things over the tracks of the city companies. Yet with the growth and spreading out of our cities, what were formerly rural districts served only by interurban lines, are taken within the cities or become so populous as to justify transportation service on a city basis. Hence, there are cases in which city companies desire to operate over lines owned by interurban companies and it becomes evident that contracts for joint use of tracks are not merely one-sided agreements for the rental of city facilities to interurban companies, but rather are of the nature of a mutual co-operation.

The Proper Basis of Compensation

Again the necessity of a rearrangement of the basis of fare, which has become acute in the last two years, has turned attention in many communities to the question of the desirability of a partnership between the city and the city street railway lines on a "service-at-cost" or some similar basis. In some instances this has necessitated the consideration of the segregation of city lines from interurban lines hitherto owned and opened as a common system. This factor in the situation accents the mutuality of trackage agreements.

The basis of compensation being the prime essential of any agreement, the company owning the facilities must be safeguarded against loss due to wear and tear on those facilities and properly might expect a fair profit on their use. In the same way the "renter" of the facilities must be accorded such terms as will not be onerous and result in an undue burden on his earning power.

Aside from the actual payments made for the use of the track and other facilities, there is another consideration and that is the stimulation or loss of traffic on one or the other or on both lines, due to the joint use of facilities. The possible interference with car movements with their resultant higher operating costs must be also considered. There arise then in this connection these considerations:

1. Does the interurban line act a feeder to the city lines and does it produce a considerable amount of traffic for them? Is this gain greater for the city lines than for the interurban lines?

2. Is the joint use of track and other facilities mutually beneficial in stimulating traffic for both interurban lines and city lines?

3. Does the interurban line gain in traffic without materially increasing the traffic for the city lines?

4. Does the interurban line deprive the city company of any traffic which would go to the city cars operating over the joint trackage?

Where the city lines are municipally owned or controlled it might be proper to consider the operation of interurban cars over city tracks and to city terminals in the light of advantage to the people in general and to the tradesmen and industries in particular. The stimulation of trade to a retail center by bringing in customers from outlying sections and a similar broadening of the labor market might, could also well be considered in fixing the compensation for use of the city facilities.

Existing contracts determine the amount of compensation, except in minor instances where an agreed rental is paid, on four general bases, as follows: (1) On the number of passengers carried; (2) on car-miles operated; (3) on ton-miles operated; (4) on the actual revenue (particularly with regard to freight and terminal stations where through tickets are sold).

Compensation for Passenger Cars

Many of the existing agreements were entered into at the time that the 5-cent flat fare was the general rule, the division of fares being computed on that rate with the

assumption that the ratio is still maintained where increased fares have been put into effect. (A number of these cases are cited from an article published in the STREET RAILWAY JOURNAL in December, 1906.)

Class 1. The interurban company furnishes crew, car and also pays crew. City company supplies track and power. Payment made on basis of fares.

Case 1. City company receives 5 cents per passenger carried on interurban cars; does not honor transfers.

Case 2. City company receives 5 cents per passenger carried on interurban cars; honors transfers without charge.

Case 3. City company receives full fare (5 cents cash and tickets and identification checks valued at $4\frac{1}{6}$ cents) with provision for a sliding scale. In addition to the full fare the interurban company will pay to the city company $\frac{3}{4}$ cent per passenger carried until the annual receipts amount to a fixed sum ($50,000) after which the $\frac{3}{4}$ cent per passenger will not be paid. After the amount received by the city company reaches the second fixed sum ($70,000) per annum, the amount paid by the interurban company to the city company will be reduced to 4 cents per passenger carried. Transfer privileges are included.

Case 4. The city company receives 4 cents per passenger carried on interurban cars. No transfer privileges.

Case 5. The city company receives $3\frac{1}{2}$ cents per passenger carried on interurban cars.

Case 6. The city company receives 3 cents per passenger carried on interurban cars. No transfer privileges.

Case 7. The city company receives $2\frac{1}{2}$ cents per passenger carried on interurban cars. No transfer privileges.

Case 8. The city company receives 3 cents for each local passenger carried on interurban cars and 1 cent for each through passenger.

Case 9. The city company receives $2\frac{1}{2}$ cents for each local passenger carried on interurban cars and 1 cent for each through passenger. The city company also receives 4 cents per car-mile for power and use of track.

In practically all instances coming within the above cases, unless otherwise noted, the interurban cars either carry no local passengers or else pay the city company the full fare for such passengers.

Class II. City company furnishes crew, track, power and also pays crew. Interurban company furnishes car. Payment made on the basis of fares.

Case 1. The city company keeps the entire fare and gives transfers.

Case 2. The interurban company receives 1 cent per passenger. The city company gives transfer.

Class III. The interurban company furnishes crew and car and also pays crew. The city company supplies track and power. Payment is made on a car-mile basis.

Case 1. The interurban company keeps the entire fare, but pays the city company for each car-mile, the average gross receipts per car-mile earned by the local cars of the city company on the same route, the figure being determined monthly. Through passengers receive free transfers, but transfers to local passengers are redeemed by the interurban company at $2\frac{1}{2}$ cents each.

Case 2. The interurban company keeps the entire fare but pays the city company for each car-mile the actual cost for power and maintenance. The cost of repairs and renewals of tracks used by the city cars operating over the same tracks is determined monthly, to which is added interest on the investment at 7 per cent per annum and taxes thereon. City passengers are not carried on interurban cars and there are no transfer privileges. (This arrangement is under a "service-at-cost" franchise which necessitated the segregation of city property from interurban property formerly owned and operated by the same company. The agreement embodies the reciprocal right of the city company, within the discretion of the city's railway commissioner to operate city service over interurban lines lying within the city limits.)

Case 3. The interurban company pays the city company at a flat rate (25 per cent) per car-mile for the use of track and power.

Class IV. The city company furnishes crew, track and power and also pays crew. The interurban company furnishes cars. Payment is made on a car-mile basis.

Case 1. The interurban company receives 2 cents per car-mile for the use of its car and maintenance. The city company keeps entire fare.

Case 2. The interurban company receives 1 cent per car-mile for the use of its car and maintenance. The city company keeps the entire fare.

Class V. The interurban company furnishes track and the city company furnishes power and operates its cars over a portion of the interurban line within the city. Payments for use of track are made on a ton-mile basis; and for power on a kilowatt-hour basis.

Case 1. The city company pays to the interurban company such proportion of the monthly cost of maintenance (including pavement) and renewals of track, roadway and overhead line, including a return on the investment at 8 per cent per annum, as the ratio of the ton-miles of the city cars operated bear to the total ton-miles of all cars operated over the tracks, the ton-miles to be computed on the basis of the cars operated unloaded. The interurban company to pay the city company for energy at the rate of 1 cent per kilowatt-hour, the total power consumption for the section to be divided in the same ratio as the ton-miles of the interurban cars operated over the section bear to the total ton-miles of all cars operated over the section. (Agreement under order of Wisconsin Railroad Commission in cases of Milwaukee Electric Railway & Light Company (city lines) and the Chicago & Milwaukee Railway and the Milwaukee Northern Railway (interurban lines) within the city of Milwaukee.)

The above cases include the most general forms of agreement on the bases for compensation, but there are many variations of the same general principles, as illustrated by the following miscellaneous cases. Unless otherwise, indicated the interurban company furnishes and pays the crew.

Case 1. It is optional with the city company whether it supplies crew or allows the crew of the interurban company to operate car. The city company receives full fare and 3 cents per car-mile in addition.

Case 2. The city company receives $3\frac{1}{2}$ cents per passenger carried on the interurban car and a stated sum of $500 per month in addition.

Case 3. Crews are supplied by the city company but the interurban company pays half of the platform expense. The city company gets the entire fare.

Case 4. The city company gets a fixed sum of 12 cents per car-mile for the use of track and power. Transfers are redeemed by the interurban company at 3 cents each and by the city company at 1 cent each.

Case 5. The city company receives 3 cents per passenger carried on the interurban cars and the interurban company pays part of the maintenance costs prorated on a car-mile basis.

Case 6. A flat rate $1 per car is paid by the interurban company. A flat rate of 50 cents per trail-car in addition.

Case 7. The interurban company pays a fixed sum per car-mile and $1\frac{1}{6}$ cents per passenger carried on the interurban cars.

In some cases the charge includes use of tracks, power and terminal facilities, if any, while in others there is a fixed rate based on either the passengers carried on the interurban cars or rate per car-mile and an additional charge of 1 cent per passenger boarding interurban cars at the terminal station.

The compensation agreed upon does not necessarily reflect the mileage of city track used by the interurban company, as in some instances more is paid per passenger carried on interurban cars for the use of 1 mile of city track than is paid in other cases for the use of 2 or 3 miles of city track.

COMPENSATION FOR FREIGHT CARS

Much divergence appears in regard to the compensation paid for the right to operate freight and express cars over city lines. Some of the cases cited are taken from contracts which also cover the use of facilities by passenger cars and some from contracts in which only freight and express cars are considered.

In most contracts the cost of handling freight at the city terminal is not mentioned, it appearing that this is done by the interurban company's own employees and at its expense unless otherwise noted.

Class I. The interurban or express company furnishes cars and crews and pays the city company a percentage of its freight or express earnings.

Case 1. The city company receives 17.5 per cent of the gross freight revenue from a station specified as the maximum limit and from intermediate stations. The city company furnishes the freight terminal.

Case 2. The city company receives from 5 to 10 per cent of the freight revenue depending upon the distance the shipment is hauled. The basis for terminal arrangements is not available.

Case 3. The interurban company pays the city company on the basis of net revenue received for each shipment in the ratio of the number of miles of city track used to the total miles the shipment is hauled. The arrangement for terminal facilities is not available.

Class II. The interurban or express company furnishes cars and crews and pays the city company on a tonnage basis.

Case 1. The interurban company pays the city company at a flat rate per ton of freight handled.

Case 2. Terminal charges are prorated among several companies using the terminal on a tonnage basis of freight handled inbound and outbound.

Class III. The interurban or express company furnishes the car; the city company furnishes the crew. Settlements are made on a tonnage basis.

Case 1. The city company takes over handling of the car and freight at the point of junction and establishes its own tariff as part of the joint through rate.

Case 2. Division of revenues is made on a tonnage basis. The city company supplies the terminal and pays the handling costs at the terminal.

Class IV. The interurban or express company furnishes cars and crews and pays the city company on a car-mile basis

Case 1. The interurban company pays the city company at the rate of 40 cents per car-mile. The basis for terminal arrangements is not available.

Case 2. The interurban company pays the city company at the rate of 31.16 cents per car-mile, this charge including terminal facilities, but not handling.

Case 3. The interurban company pays the city company 25 cents per car-mile and pays an additional flat rate of $1.06 per car for terminal facilities.

Case 4. The interurban company pays the city company at the rate of 25 cents per car-mile and a proportion of terminal expenses on a tonnage basis.

Case 5. The interurban company pays the city company at the rate of 25 cents per car-mile, this charge including terminal facilities.

Case 6. The interurban company pays the city company 15 cents per car-mile and 75 cents per car for terminal facilities. The interurban company pays its own handling expenses.

Case 7. The interurban company pays the city company a percentage of revenues on a basis of the ratio of miles of city track used to the miles traversed by the freight car. No terminal facilities.

Class V. Miscellaneous.

Case 1. The interurban company furnishes cars and crews and pays the city company a proportion of interest, depreciation and maintenance on track and roadway and a flat rate for power.

Case 2. The interurban company furnishes cars and crews and pays the city company $1 for each trip of each motor car and 50 cents for each trip of each trail car.

Case 3. The interurban company furnishes the car; the city company furnishes the crew and handles freight from the city line. The interurban company pays the city company $2 for each inbound or outbound trip; also a tax levied by the city and reimburses the city company for wages paid crews. Terminal facilities and handling are provided by the city company.

TRAFFIC REGULATIONS AND CONTRACT OBLIGATIONS

The "proper traffic regulations" and the "contract obligations of each company" are matters that should be carefully considered and explicitly set forth in an agreement covering the joint use of tracks and terminals.

Traffic regulations are partly within the discretion of the "owning" company, but are largely prescribed by franchise conditions, local ordinance and state law, so that a general stipulation that the "renting" company shall abide by these restrictions, or similar restrictions hereafter enacted are generally made a part of the agreement.

Other obligations of the contracting companies are wholly within their discretion, but the careful analysis of all matters affecting each of the companies and specific agreements covering them frequently avert future misunderstandings, while some provision for arbitration, or other means of settling misunderstandings, will tend to avert difficulties during the life of a contract.

The chief factors aside from the compensation to be considered in making a joint use of tracks agrement may be classified as follows:

1. Preamble—Setting forth the purpose of the agreement, the territory and lines affected, etc.
2. The connection—Setting forth engineering requirements, first cost, maintenance and the like.
3. The route—Lines covered by agreement, emergency rerouting, future permanent rerouting and the like.
4. Schedule and headway—Maximum and minimum number of cars to be operated, precedence, revision of schedule, etc.
5. Character of equipment to be furnished by the "owning" company—Track, overhead equipment generating facilities, voltage, interruptions, sidings and crossovers.
6. Character of equipment used by the "renting" company.
7. Valuation—Including depreciation, renewals, deferred maintenance and the like.
8. Repair and maintenance of cars.
9. Terminal stations—Location, cost of construction maintenance, restrictions on use, operating costs, etc.
10. Crews on cars—Responsibility, supervision, conditions of employment, duties, etc.
11. Fare collections—Methods of collections, registration, checking and the like.
12. Damages to the public—Division and determination of responsibility.
13. Damage between respective companies.
14. Free transportation—Regulation of issuance of passes, rights of employees on cars of other companies, etc.

15. Settlements—Time allowed for settlements, auditing of accounts, penalties for non-payment.
16. Competition—Restrictions against future competition, direct or indirect.
17. Freight and express cars—Any special provisions regarding use of such cars.
18. Length of agreement—Renewal of agreement.
19. Arbitration—Settlement of disputes, forfeiture, etc.
20. Miscellaneous clauses.

The relative importance of these clauses is largely dependent upon the nature of the agreement as to the method of computing compensation for the use of the tracks and terminals—whether it be on the basis of the number of passengers, or tons of freight carried, on car-miles or ton-miles operated, on the revenue received, or on a "cost-of-service" basis.

Depending upon this factor of the method of compensation, phases of the agreement which might require elaborate and detailed treatment in one contract might be amply covered with a simple clause in another.

For instance, if the agreement provides that the fares collected on the "renting" company's cars are to be divided between the two companies, the question of valuation, depreciation and deferred maintenance are of little or no importance; but if the agreement is that the "renting" company shall pay its share of the maintenance, renewal and return on investment on a given section in the ratio of the car-miles or ton-miles operated by it over that section to the total car-miles or ton-miles operated over that section, the matters of the investment on which a return shall be paid and the condition of the facilities at the time of making the agreement are of vital importance.

The committee concluded its report by stating that after a study of the various contracts available, it is of the opinion that it is not feasible to draft a standard form, or forms of contract which would fit the many and variable conditions of the industry. It is of the opinion that certain prime factors in all cases enter into such contracts whether the payment by one company for the use of facilities of another company are based upon a division of the revenue, the number of passengers carried, the number of car-miles or the number of ton-miles operated and that these factors, which must be considered in arriving at a fair and equitable rental, are: (1) Maintenance and repair of the facilities jointly used. (2) Incidental expenses of operation such as snow-cleaning, greasing of switches and curves, sprinkling, etc. (3) Depreciation. (4) Taxes. (5) Fixed charges. (6) Fair return on the fair value of the property and privileges.

The committee was also of the opinion that the best interest of both parties to a contract for the joint use of facilities are most readily served by the following methods:

I. When the renting company supplies cars and crews and pays the crews, but carries no local passengers:

(a) By the renting company paying the owning company such part of the charges as its use of the facilities bear to the total use of such facilities, either

1. On the basis of the ton-miles (not including loads), where there is considerable difference in the equipment used by the two companies, or
2. On the basis of the car-miles operated, where there is no such considerable difference in equipment.

(b) By the payment for power used on a basis similar to (a), or upon a flat rate per kilowatt-hour with provision for the readjustment of the rate each year or at similarly convenient intervals.

(c) By the payment for terminal facilities on a basis similar to (a), or upon a basis of the number of passengers or, tons of freight handled.

II. When the renting company supplies cars and crews and pays the crews and hauls local passengers.

By the renting company paying to the owning company a part of the charges as outlined in Sec. I, and in addition all, or a stated part, of each local fare collected, due regard being had for the saving in the number of cars thus effected by the company owning the facilities jointly used.

III. When the outside company turns its cars over to the owning company which supplies and pays the crews.

By the payment to the company owning the cars by the company owning the jointly used facilities a stated amount for each car-mile operated by the foreign cars while in its possession.

This report was signed by R. T. Sullivan, chairman; H. W. Clapp, J. F. Collins, and A. Swartz.

DISCUSSION ON JOINT USE OF TRACKS

In discussing the report, G. T. Seely, Chicago Elevated Railways, said that many of the interurban companies entering cities do not carry any local business and charge their passengers over the city lines the same rate per mile as they receive on their own properties. He thought this was desirable because the terminal facilities are likely to eat up such a large portion of the revenue per passenger. Mr. Seely also remarked about the undesirable practice of forcing interurban cars to trail along behind a city car on its way to the central terminal. He thought that arrangements should be made for the city car to take a siding to permit the interurban to pass and thus cut down the running time. He said the interurbans lost a large amount of business on account of this slow service through the city.

Frank R. Coates, Toledo Railway & Light Company, said that he believed the committee should recommend the formulation of a joint contract which would serve as a starting point for drawing up new contracts. He thought this would simplify the making of contracts. He made a motion that the committee should be continued if this conformed to the wisdom of the executive committee. This motion was later approved by the convention.

J. N. Shannahan agreed with Mr. Coates and thought that there should be a basic contract on file with the association as a guide to the making of new contracts, and in order that there might be some uniformity about them.

R. P. Stevens, Mahoning & Shenango Railway & Light Company, said that new contracts of this character would have to be made in connection with the installation of service-at-cost franchises. In anticipation of this the committee had compiled all information necessary and thought that the actual work of drawing up the contracts could be left to the legal department.

President Pardee of the American Association entered the meeting at this point and was received by President Bradley, who requested him to make a few remarks, the latter leading up to this by some very complimentary comment upon the manner in which Mr. Pardee has served the association.

President Pardee responded by saying that whatever success had been attained during his administration was due to the able assistance which had been given him by the committee members and by the secretary's office. He thought that the man who conceived the idea of affiliated associations and completed the arrangements whereby all branches of the industry meet simultaneously, did a magnificent service. He attributed the great progress which the association has made to this affiliation of the various branches of the industry.

The report of the committee on resolutions was then read by the chairman, R. T. Sullivan. The report embodied two resolutions, the first one expressing the thanks of the association to President L. C. Bradley and the other officers and committee men because of their long and efficient service in office and because of the splendid efforts

they have put forth in making the convention of unusual interest and value. The other resolution expressed the appreciation of the association to the manufacturers for their live interest and their application of new methods and the creation of new appliances in solving the problems of the industry, and thanked the committees in charge of the exhibits at the convention.

At this point L. H. Palmer, chairman, read the report of the nominations committee, as follows: President, W. H. Collins, Fonda, Johnstown & Gloversville Railway; first vice-president, R. P. Stevens, Mahoning & Shenango Railway & Light Company, Youngstown; second vice-president, L. H. Palmer, United Railways & Electric Company, Baltimore; third vice-president, G. T. Seely, assistant general manager, Chicago Elevated Railways; secretary, E. B. Burritt.

The members of the executive committee chosen were J. K. Punderford, the Connecticut Company, New Haven; George H. Clifford, Northern Texas Traction Company, Fort Worth, Tex.; A. Gaboury, Montreal Tramways, and T. C. Cherry, Maryland Electric Railways, Annapolis. The convention then authorized the secretary to cast a unanimous ballot electing these officers.

Looking over the list of names, Past-President Bradley predicted that next year would be the greatest in the history of the association. He commented upon the splendid support which had been given him during his term of office by all members of the association and said that the past three years had been one of the greatest delights of his life.

Mr. Collins, president-elect, made a brief talk expressing appreciation of the very great honor which had been bestowed upon him and pledging his best service to the progress of the association.

Collection of Zone Fares*

A Distance Fare System Is Desirable and Expeditious Collection Will Be Developed with Experience During the Next Few Years

By George Kuemmerlein, Jr.
Milwaukee Electric Railway & Light Company

THE experience of electric railways during the last two or three years with increases in unit fares above 5 cents has not been as satisfactory as the operators and regulating commissions had hoped for. Splitting the nickel is bound to cause some reaction and reduce travel. Probably the ideal scheme of fares for inducing short-haul travel where the service is sufficiently frequent would be to have a fare sufficiently below 5 cents so that the saving would be appreciable. Had the 1914 costs of operation continued during the last five years, there is no doubt but that a number of electric railways would have undertaken this step.

I anticipate that during the next few years there will be substantial advances in practical methods of collecting distance fares in congested areas in American cities. The European experience affords little guide because of the fact that the scheme of fare collection there used requires that the conductor go through the car and collect a fare from each passenger after he has taken a seat, and under conditions much more favorable to the conductor than obtain here in America. The standing loads on European tramways are limited to a very small number, whereas in America the standing loads are controlled partly by the patience of the passengers and partly by the floor area of the car. Moreover, our American roads operate largely upon the pay-as-you-enter or pay-as-you-leave system.

The type of fare collection system needed to meet our American conditions depends somewhat upon the density of traffic and somewhat upon the existence of definite zones. It is conceivable that in a system of distance-tariff where the passenger paid by the mile of ride as in a taxi and without respect to his point of origin or point of discharge, except as such determined distance, will require a different system of fare collection than one where zone points have definite geographical locations. All systems so far tried or in operation in this country involve definite geographical zones. The most conspicuous example of the zone or distance-tariff fare collection is that in operation on the lines of the Public Service Railway in New Jersey.

In planning for the Milwaukee system we saw the necessity of providing for the prepayment of fares to points where the number of passengers discharged was large; we feared the delays which might result from the application of a pay-as-you-leave principle. The troubles to which the Public Service Railway has been subjected in the operation of its zone fare plan have largely come from the delays involved in requiring passengers to pay their fares when getting off cars. Probably a different type of car might have made the problem somewhat easier, but points of heavy discharge were bound to cause disturbances.

Every system of zone-fare collection on through cars will require the use of some form of identification check, showing the origin of the passenger and requiring the surrender of such check upon leaving the car. Fare registration is not essential in any system where there is the proper degree of co-operation between the trainmen, the public and the utility.

* Abstract of paper presented at meeting of Transportation & Traffic Association, Oct. 8, 1919.

F. R. PHILLIPS
President

Engineering Association Proceedings

Among New Subjects the Engineers Considered Particularly Helical Gearing and Automatic Substations—They Launched a Campaign to Promote Greater Use of the Association Standards and Showed an Exhibit of Standard Sample Products in Connection Therewith—Excepting for Addresses on Construction Work in France and Gasoline Drive for Railway Cars, the Program Consisted of Reports and Discussion Thereon—E. R. Hill was Elected President

E. R. HILL
President-Elect

THE American Electric Railway Engineering Association held its opening session of the convention in Engineers' Hall on Monday afternoon. The session was opened by President F. R. Phillips, Pittsburgh Railways, with the annual presidential address. This appears in abstract below.

President Phillips' Address

Certain changes which have been made in the plan of committee work of the Engineering Association were the opening theme of Mr. Phillips' address. The modification of methods in vogue and new features were these: (a) Prompt organization of incoming administration to the end that more time would be available to committees for the prosecution of their work. (b) Organization of the committee on standards upon such a basis that a higher degree of refinement might be obtained in the standards and recommended practices. (c) Promulgation of a more universal use of association standards. (d) A convention program that would hold the interest of the members in attendance at conventions.

In line with this program a rule was adopted providing that members of standing or special committees automatically became ineligible for membership on the committee on standards. Moreover, it is held that since the measure of usefulness that this association is to the industry lies in the character and quality of recommendations for standards and recommended practices, the committee on standards becomes the most responsible and important body within the association. Its function may well be likened to that of the Supreme Court of the United States; while the executive committee forms the administrative and the working or technical committees, the legislative branch of association government.

The most frequently repeated criticism of the Engineering Association is the allegation of non-use of association standards, arising from a lack of substantial interest upon the part of the membership at large. In Mr. Phillips' opinion the criticism has obtained principally for the following reasons:

1. We have been delinquent to the extent that the membership at large has not been properly and thoroughly informed as to the existence of association standards and practices and the benefits accruing from their use.

2. Certain of our standards and recommended practices lack form or need revision in response to later development in the art.

3. Many of the manufacturers of materials and supplies until recently have not contributed that support which at least the merit of the case warranted.

Happily, recent developments resulting from a campaign of publicity launched by the standards committee, together with vigorous effort by technical committees to revise present standards and recommendations as well as a new relationship with manufacturers, bid fair in the near future to remove the cause for criticism.

Mr. Phillips then made a résumé of the work of the technical committees and explained how the program for the convention had been planned to provide material of interest for all engineers. He explained also the plan of the American Engineering Standards Committee and said there is without doubt a wide field for real constructive work for such an organization. However, it could be made much more effective were it to include in full membership on the main committee representatives from all branches of engineering. The American Electric Railway Engineering Association is the recognized representative in engineering work of the third largest industry in this country and it would seem essential that it be admitted to full membership.

It is recommended that after a prompt study of all features of the situation and, if it is deemed wise under the circumstances, proper representations be made to the end that this association be accorded the consideration to which its importance in the field of engineering entitles it.

Among other matters taken up by the speaker were the statistical bureau and the appointment of J. W. Welsh as special engineer, and the relations of the association with the claim agents and storekeepers. On this last point he said that for several years past the association has been searching for means through which the needs and desires of our purchasing agents and storekeepers could be properly met. Numerous plans have been proposed. About the time of the suspension of association work in 1917, it had been planned to provide such means through the Engineering Association, and provision for setting aside a portion of the program to be devoted to matters of particular interest to them was contemplated. Upon further consideration of the matter, it was decided to provide self-determination for them and, this year, they have meetings planned for, and will no doubt for themselves adopt measures which are suitable.

It would seem proper that the Engineering Association should afford such co-operation as may be helpful to them and should be prepared to meet their desires in an acceptable manner.

In conclusion Mr. Phillips urged the need of a vigorous campaign to arouse a more active interest in the affairs of the association upon the part of the membership at large, with particular reference to the use of association standards. He suggested that a close, harmonious working arrangement with the manufacturers be maintained wherein the manufacturers in some measure become sponsors for association standards.

The members should inform themselves thoroughly in all

of the various aspects of the case of the industry now pending before the court of the people, and put before their friends and acquaintances at home the real truth of the matter. Thus they will not only support their company officers in the great struggle now going on but will perform a real service to the community.

A crisis in the electric railway industry impends. As an association and as individuals the members should be prepared to perform, with vigor and enthusiasm, whatever duty they may be called upon to perform.

It should be borne in mind that the time and effort expended by officers and committee members necessary to produce results is a gratuitous contribution to the welfare of all members as well as to the industry. The membership of the committees is made up of men who, because of their knowledge and achievements in electric railway work, are entitled to the confidence and respect of all. The members should study their work and give heed to their advice.

Though threadbare from frequent repetition it is still axiomatic that "without faith no cause is secure." Enthusiasm is the outward expression of faith. The officers and leaders in the association should therefore be accorded the enthusiastic support which is rightfully theirs.

Report of Executive Committee

The report of the executive committee was next read.

In filing its report with the association, the executive committee reviewed its activities since the 1916 convention, the report consisting of the minutes of the meeting held on the last day of that convention and since.

One of the most important features covered by the report was the discussion of a revision of the method of adopting association standards. The subject was broached originally by G. W. Palmer, Jr., first vice-president, at the meeting held on Oct. 13, 1916. Mr. Palmer frankly criticised some of the procedure in the adoption of standards in the past, and illustrated his contention by referring to specific incidents of what he considered unfortunate procedure. His address to the committee was considered so important that it was voted to include it in full in the minutes and to bring the matter up for discussion later. At the following meeting it was decided to adopt Mr. Palmer's recommendations and to change the composition of the standards committee so that it would consist of nine members, no one of whom should be a member of any other committee charged with the preparation of standards. The committee is so constituted at present, with the addition of six members appointed to represent manufacturers in accordance with a plan adopted in 1917.

The work of the standards committee was brought up again at the meeting of Feb. 9, 1917, when, after discussion, the report of the sub-committee, consisting of Messrs. E. R. Hill, G. W. Palmer, Jr., and Martin Schreiber, covering the procedure in the handling of standards and recommendations was adopted. This procedure is as follows:

1. Standing committees to make their reports as formerly in time for consideration by the standards committee by July 15.

2. The standards committee will consider such recommendations and if the subject matter be deemed of sufficient merit, it will be sent to member companies as provided in Par. 3 below; if deemed not of sufficient merit it will be sent back to the standing committee. If it seems especially desirable to the standards committee certain proposed recommendations or standards may be presented by it to the convention for discussion, but not adoption.

3. The proposed standards or recommendations will then be forwarded to the secretary to be sent out to member companies for their comments and recommendations; if the discussion is considered sufficiently adverse it will be sent back to the standing committee.

4. After receiving comments and recommendations of member companies the same will be forwarded to the standing committee who in turn will report the matter a second time to the standards committee on July 13 of the following year.

5. The standards committee will then take final action and report to the convention. If favorable it will recommend final adoption, otherwise it will give reasons for disapproval.

6. In handling the reports on the convention floor only matters pertaining to standards and recommendations will be submitted and discussed, and such matters will be presented by the standards committee. (The purpose of this is to give ample time for discussion of important matters and to leave time for the introduction of other interesting features.)

7. In the revision of existing standards and recommendations, the standards committee may, in its discretion, either pursue the course as outlined above or report the matter direct to the convention for final action.

The above is suggested as the normal procedure, it being thought that in cases of special urgency or necessity these rules may be suspended by the convention upon recommendation of the standards committee and ratification by the executive committee, and final action taken at the first presentation at the convention.

Another important action taken at the Feb. 9, 1917, meeting was the decision to augment the technical committees by the addition of representatives of manufacturers to the following extent: Six members on the equipment committee, three members on the power distribution committee, three members on the committee on way matters, and two members on the power generation committee.

At the same meeting a resolution was adopted to the effect that the president of the American Electric Railway Association be requested to designate the chairmen and vice-chairmen of all joint committees from among the members of such committees, and where the chairman is selected from one association that the vice-chairman be selected from the other association represented.

Without going into further details of important actions, it will suffice to say that during the war interim the committee discussed propositions for holding a meeting of purchasing agents at the convention, for encouraging apprentice plans in electric railway shops, for possible changes in the form of the Engineering Manual, and other topics which will presumably now be revived.

The presentation of the above abstract brought out the question from H. H. Adams, Chicago Surface Lines, as to whether an approval of the report carried with it an approval of the recommendations concerning the adoption of standards. R. C. Cram, Brooklyn Rapid Transit Company, expressed the opinion that it did not seem wise to delay the adoption of standards pending the approval by member companies, as few answers are obtained to such questionnaires. Upon decision that acceptance of the report did not approve the recommendations the report was accepted.

The report of the secretary-treasurer explained that as a result of a decision of the executive committee of the American Association it became necessary to discontinue the practice of paying the expenses of committee members. The expense of the association has therefore been confined to that connected with the publication of the proceedings and other incidental expenses. Committees on power distribution, power generation, equipment, way matters and buildings and structures have been actively engaged in the preparation of reports during the past year and a number of special committees have had their work incorporated in that of the standing committees.

A drive has been started in the promotion of the use of the standards and an exhibit of the approved standards appeared in the association booth. Fifteen new individual members and 155 company section members have been accepted. This report was accepted.

The committee on resolutions appointed by the president included H. H. Norris, ELECTRIC RAILWAY JOURNAL, C. Rufus Harte, Connecticut Company, and C. S. Kimball, Washington Railway & Electric Company. A committee on reception to those who were to deliver addresses before the convention was also appointed and included Martin Schreiber, Public Service Railway; J. H. Hanna, Capital Traction Company, and C. L. Cadle, New York Railways.

Power Distribution

C. L. Cadle, chairman of the committee on power distribution presented its report. He stated that the subjects assigned to this committee for this year were: (1) Revision of the joint specifications for overhead and underground wire and cable crossings over railroad companies' right-of-way. (2) Revision of specifications on wires and cables with special reference to stranding of cables and thickness of 600-volt insulation. (3) Standard thread for pins and insulators.

With reference to the first subject the committee found that the present specification for overhead crossings of electric light and power transmission lines which was adopted by the convention in 1913 as a "recommended specification" has become somewhat obsolete, due to the promulgation by the Bureau of Standards of the National Electrical Safety Code. An attempt was made to revise this work and joint sessions were held with the American Railway Association and the American Railway Engineering Association. After many conferences a tentative specification was agreed upon which was presented to the association for consideration.

This report is divided into four parts and contains four appendices. Part 1 gives specifications for use with overhead crossings of electric light and power supply lines irrespective of voltage. The items taken up are clearances, loading conditions, working stresses, foundations, location of supports, steel poles and towers, wood poles, crossarms, pins, insulators, tie wires and clamps, spans, guy anchorages, guys and grounding. Part 2 gives requirements for trolley line crossings and deals with clearances, trolley wire construction, trolley guards, span construction and high-potential trolleys. Part 3 takes up underbridge crossings and Part 4 underground crossings.

The four appendices give tables and curves of conductor sags, tables of wind and ice loads and properties of wire, specifications for wood poles and specifications for galvanizing and sherardizing. The report is very complete and contains much valuable information.

The subject of the revision of specification for wire cables with special reference to stranding of cables and thickness of 600-volt insulation was considered at the request of the American Institute of Electrical Engineers and the War Department of the United States government, as it was desirable to use wires of standard size in the make-up of large stranded cables. The committee submitted a suggested revision in the form of a table but recommended that this be not adopted until the joint committee of the several associations considering this subject has definitely settled the new table of stranding.

On the subject of a standard thread for pins and insulators, the statement was made that this matter was taken up actively during the early part of this year, but, owing to lack of time no definite action was taken. The committee therefore "reported progress" and suggested the reference of this subject to the next committee.

The revision of the specification for overhead line material was considered at considerable length. Certain minor changes in the wording of the existing standards were recommended to the association. The entire specification was reprinted with words in brackets to indicate omissions and words in italics to indicate additions. Corrections were also made to drawings illustrating the specification.

The committee stated also that the association has had in the Manual, among "Miscellaneous Methods and Practices" a specification for electric conduit construction. This report was presented to the association and approved at the convention in the fall of 1909. The committee felt that a number of companies were in need of a more detailed specification and therefore proceeded to draft one which was recommended for adoption as a standard. Recommendations in connection with the use of ducts, the covering of all cables passing through steel pipes with a weatherproof braid and the use of a fiber duct for conduit construction were recommended. Recommendations were also made regarding the construction and use of manholes.

Discussion on Power Distribution

In connection with the above report C. Rufus Harte moved that A. L. Clarke and William Sellner, of his staff, be extended the thanks of the association for assistance in the preparation of drawings accompanying the specifications on overhead line materials. In this the association unanimously concurred.

The discussion of the report was opened by M. B. Rosevear, Public Service Railway. Mr. Rosevear suggested several changes in wording and certain specifications of equipment. He suggested the specification of welded eyes on anchor bolts, the use of 3/32 in. rather than 3/16 in. lock washers on tap bolts, the approval of one-part as well as two-part pole bands, the use of $1\frac{1}{8}$-in. rather than $1\frac{1}{4}$-in. diameter boss face on mechanical ears and a specification of six rather than four pull-off eyes on frogs and uninsulated crossings. A few changes in the drawings were also suggested, and the query was raised as to what is an equivalent to porcelain for insulators. To this W. D. A. Peaslee, Jeffery Dewitt Insulator Company, replied that no such equivalent had been found and urged that the best materials be used for this purpose. In connection with tests on porcelain insulators, Mr. Peaslee urged that what is known as the "Fuschine" dye test be included as a part of the specifications. He exhibited several porcelain insulators that had been submitted to this test after having passed the water immersion and absorption test as given in the specifications. The discoloration of the insulators to a considerable depth was very marked. In answer to a question Mr. Peaslee said this porosity test should be applied to low-voltage as well as high-voltage insulators, as such a test gives an indication of the mechanical strength of the insulators, and this is just as essential for low voltages as for high. When an insulator has once started to crack, it is worthless.

Norman Litchfield, American Car & Foundry Company, suggested that it would be of benefit to the association to know the extent to which association specifications and standards were being used, and he asked for a statement from the various representatives of the railways present. Representatives of the Connecticut Company, the Public Service Railway of New Jersey, the New York State Railways, and the Schenectady Railways all said they were using A. E. R. A. standard material or some that conformed very closely to the association standard. Mr. Harte said that it would be of great benefit to all concerned if the various manufacturers would catalog their various parts as A. E. R. A. standard and follow with the manufacturer's catalog number. Mr. Phillips said that recommendation for such a method had already been included as a part of the drive to promote the use of association standards.

James H. Drew, Drew Electric & Manufacturing Company, said he thought that the Engineering Association should provide some means for putting its "O. K." on any satisfactory standard submitted. He said it was an easy matter for any manufacturer to say that his product was an A. E. R. A. standard but a certain definite procedure would prevent misunderstandings and safeguard the customer, the association and the manufacturer as well. He felt that all manufacturers would welcome some standard way of labeling their products as complying with the association requirements and they would like some authority to say that their parts were A. E. R. A. standards.

Mr. Cadle closed the discussion on overhead material and conduit construction and recommended that the suggestions

which had been made during the discussion be referred to their proper committees for consideration next year.

A motion was adopted approving the revision of the specifications for overhead line material as included in the committee's report and the recommendations of the committee on power distribution regarding the revision of the specifications for electrical conduit construction as recommended for approval as "standard practice" by the standards committee.

Mr. Rosevear also opened the discussion on railway crossings and pointed out a number of things which were contrary to the practice of his company and which appeared objectionable to him. He said that his company is using wire as small as No. 10 A. W. G. in some cases over railroad crossings and that he thought that sizes between No. 6 and No. 10 should be included in the specifications. He pointed out that the specification states that insulators shall be made of porcelain. His company uses glass in a good many cases and this material has proved entirely satisfactory. He also called attention to several paragraphs in the specifications which were not entirely clear to him and asked that the obscure points be cleared up. Mr. Cram called the attention of the association to the style of the headings and numbering in the report which were not of the form required by the association and suggested that in reprinting these for the Manual this be given attention. Mr. Peaslee said he thought that the porosity test for insulators previously referred to should be incorporated in these specifications also.

Mr. Cadle closed the discussion and said that he knew that steam roads would not agree to having wires smaller than No. 6 A. w. g. stretched across their lines, so that there was no use trying to include these in the specifications as they would not be accepted by the steam roads.

The association approved the report of the committee on crossings and referred it to the committee on standards for action as a recommended specification.

After several announcements relating to papers and reports to be presented the second day, the association adjourned its first session.

Tuesday's Session

The second day's session of the Engineering Association proved to be a long one but was largely attended. It opened at 2.30 p. m. with the report of the committee on power generation.

Power Generation

A. B. Stitzer, chief engineer Republic Engineers, Inc., abstracted the report.

This committee reported on three topics, namely, (1) the development of automatic substations, (2) a suggested standard form of power contract for the purchase of railway power, and (3) the operating performances of railway power stations.

The first of these topics was covered in a paper prepared originally by W. C. Slade and revised under the direction of the committee. It was based partly upon the results of a questionnaire covering the following points: (1) Description of the installation, operating or proposed; (2) operating conditions of the system; (3) reasons for adopting automatic control; (4) advantages and disadvantages of automatically-controlled substations; (5) kind and extent of the inspection of equipment found necessary or contemplated, and cost of this inspection or wages to be paid the inspector; (6) troubles experienced in operating automatic control and equipment and how overcome; (7) expression of personal opinion relative to the largest capacity unit and the largest number of units in a single substation considered practicable for automatic operation.

Attention was directed to the fact that the first automatic substation control was put into operation in 1914 in the Union Substation of the Elgin & Belvidere Electric Railway. On May 1, 1919, there were thirty-five full automatic and two semi-automatic or remote-control substations in actual operation and thirty-one other automatic and four semi-automatic equipments stood on order with manufacturers. These equipments controlled several types of synchronous converters and motor-generator sets, of capacity from 200 kw. to 2000 kw., operating under many kinds of service conditions.

On the date mentioned a number of control equipments sufficient to control 37,500 kw. of rated machine capacity had been purchased. Thus far the tendency has been to apply automatic control more generally to machines having rated capacity of 500 kw. and under, the total number coming within this range being fifty-eight. This number includes twenty 300-kw. and twenty-nine 500-kw. units. A good inroad is however, being made with machines of larger capacity, as one 1000-kw. converter is now operating automatically and there are on order six 1000-kw. synchronous converters, one 1000-kw. motor-generator set, two 1500-kw. synchronous converters, and one 2000-kw. synchronous converter.

The tendency of railway companies to equip existing substation apparatus with automatic control is shown by the fact that thirty-one control equipments have been purchased as compared with forty-one complete automatic substation equipments.

A rather interesting fact is brought out in connection with the characteristics of the supply lines that are to serve the automatic installations thus far contemplated. Not only is the tendency for railways to take 60-cycle energy from central stations indicated, but also there are many reminders of the days of unstandardized frequencies. While forty-four stations are to receive 25-cycle energy, eighteen are to receive 60-cycle energy and eight will receive energy with odd frequencies including 30, 35, 40 and 50 cycles. The high-tension line voltage varies from 2200 to 66,000, the trolley voltage being generally 600, direct current, except one 1200-volt and one 1500-volt system.

While the largest synchronous yet to be automatically controlled is a 1500-kw. machine, and the largest motor-generator set is a 2000-kw. machine, there is at present in operation on a system of the Interstate Light & Power Company a 3000-kva. synchronous condenser. In Cedar Rapids, the Iowa Railway & Light Company put into operation in 1918 the first automatically-controlled water-wheel generating station, which contains three 500-kw. generators. These are arranged to operate in parallel, either under the influence of full automatic control at the generating plant or controlled, if desired, by an operator in the main steam generating station at a distant point.

WHY HAS AUTOMATIC CONTROL BEEN INSTALLED?

The majority of purchasers of automatic control were influenced solely by the saving in labor offered. On the first road equipped the labor saving during the first year was sufficient to pay for the cost of the control equipment installed in the three stations. From replies received from a half-dozen companies in 1917 it appears that their average inspection expense was $328 per station per annum, the highest figure reported being $650.

Several companies have chosen automatic equipment in consideration of the saving possible from the elimination of light load. The highest saving estimated was $400 per annum on a 300-kw. station and $700 on a 500-kw. station. One company installed a station in a new location where the operation of a manual station or the installation of sufficient feeder copper would have been too expensive for the results desired. Another company installed a 250-kw. station to

replace a floating battery in preference to spending $5,000 for necessary repairs to the battery.

In some cases where complete new automatic substations were built in new locations it was possible to remove feeder copper, which possessed a value sufficient to offset in part the cost of construction of the substation building with its equipment. In an exceptional case the cost of construction of a new two-unit substation containing two 300-kw. converters was more than offset by the value of the feeder copper removed, and a more satisfactory line voltage was obtained at the same time. The most notable saving in copper was made in Des Moines.

Another exceptional case is that of an important interurban line in central New York where, on account of the existing surplus feeder capacity, it would be possible to make an annual saving of $34,000 with approximately no investment by adopting automatic substations.

A few companies have considered automatic control even more satisfactory and reliable than manual control, on account of the elimination of the human element.

Considerations of different factors aside from those already mentioned have influenced in varying degree the selection of automatic equipment. In one case an influential item was the saving possible in the coal bill for heating, in addition to the protection against overload and arc-overs furnished by automatic control. Another company took advantage of the saving which is sometimes possible in transformer capacity due to the intermittent use of the substation.

The Future of Automatic Control

Automatic control for railway substations may now be purchased for any commercial alternating current voltage or frequency, with a maximum of 1500 volts on the direct-current side with either a single machine or with two machines operating in series. For changes in capacities of machines it is only necessary to obtain contactors and resistance grids of suitable capacity, the type of control equipment and the scheme of operation remaining the same. The application of automatic control is not limited to self-starting synchronous converters, as motor-started converters may be started automatically by reactance synchronizing. The adaptation of automatic control to motor-started converters will permit many railway companies to equip old-style machines and effect economies otherwise probably impossible unless the transformers and possibly the machines themselves were rebuilt to make self-starting possible. Automatic control is applicable to all rotating equipment, except possibly steam-driven units. With such a broad field for growth, the success of the installations made thus far, both from a financial and operating viewpoint, indicates an extremely rapid development in the immediate future.

The automatic railway substation possesses many more advantages than disadvantages. Of course, all the advantages cannot be realized in any single installation. The few disadvantages are largely common to all installations. The principal advantages are as follows: Under the head of "reduction in operating expense" these may be listed; (1) labor charges are reduced; (2) energy losses are reduced; (3) distribution losses may be reduced, and (4) line voltage may be improved.

Another advantage is in the reduction in capital investment through the possible removal of feeder copper. There are also such miscellaneous advantages as these: (1) damage from electrolysis may be reduced; (2) labor difficulties are reduced; (3) reliability of service is unimpaired; (4) portable automatic substation is adaptable to give standby capacity that minimum capital outlay may be utilized, and (5) wireless communication may be utilized for automatic substation control.

The principal disadvantages are the possible increased maintenance expense, the necessary rearrangement of the high-tension circuit that might have to be made where attendants are necessary at switching centers to handle high-tension circuits, and the danger of annealing of trolley wire.

Some Figures as to Automatic Substation Costs

Estimates have been prepared to show the comparative cost of automatic substations complete with building and equipment, the data being developed upon the assumption that the building would be large enough to house two machines of equal capacity. The results are shown in Tables I, II, and III.

TABLE I—COMPARATIVE COSTS OF FIREPROOF BUILDINGS FOR TWO-UNIT AUTOMATIC SUBSTATIONS

Capacity Each Unit in Kilowatts	Floor Area in Square Feet		Cubical Contents in Cubic Feet		Cost at 20 cents per Cubic Foot	Cost at 25 cents per Cubic Foot
	A	B	A	B	A	B
300	468	620	9,594	16,120	$1,920	$4,030
500	522	714	11,745	19,278	2,350	4,820
750	735	960	16,538	26,880	3,310	6,720
1000	1,107	1,288	26,015	37,352	5,200	9,340

In Tables I and III, A refers to building with minimum clearance around machines, of fireproof construction, but with roof trusses designed to carry roof load only, and without appliances for handling apparatus. B is a larger building, with ample facilities for handling equipment and with a reasonable degree of ornamentation.

TABLE II—ESTIMATED COSTS OF AUTOMATIC SUBSTATION EQUIPMENT INSTALLED—ONE UNIT

Capacity in Kilowatts	60 Cycles	25 Cycles
300	$13,810	$15,410
500	17,060	19,210
750	20,385	*24,400
1000	24,535	27,285

* Not standard equipment.

This table gives the comparative costs of automatic substation equipment installed applying to the single-unit station only. The figures cover the converter and three-phase transformer, a. c. and d. c. electrolytic lightning arresters, oil circuit-breaker, switchboard and all necessary automatic control equipment. A reasonable sum for erection and starting of the apparatus is included, but freight and haulage expense is not included, as such expense is variable and indeterminate.

TABLE III—ESTIMATED COSTS OF BUILDING AND AUTOMATIC SUBSTATION EQUIPMENT INSTALLED—TWO UNITS

Capacity in Kilowatts	60 Cycles		25 Cycles	
	A	B	A	B
300	$15,730	$17,840	$17,330	$19,440
500	19,410	21,880	21,560	24,030
750	23,690	27,110	27,710	31,120
1000	29,740	33,870	32,490	36,620

What Inspection Service Is Necessary for Successful Substation Maintenance

The amount of inspection that was reported by purchasers of automatic control in 1917 varies from "twice daily" to "twice a week, preferably three times." It is probable that most of the installations are receiving more attention than they will require later. Stations containing electrolytic arresters on the alternating-current lines are doubtless visited daily or at least once in every two days for the purpose of charging the arresters. A distinction must be made between brief visits not made primarily for purposes of inspection and more lengthy visits that should be made at regular intervals for thorough inspection of all the equipment.

Automatic substations should be provided with the best possible protection against lightning. Except for very low voltage, electrolytic arresters are probably most generally in use. Oxide-film arresters, which have been recently developed may, however, be used as a substitute, and for one

line of automatic control the oxide-film arrester has been made standard. For those companies which have electrolytic arresters, or which prefer to use them in future, a provision may be made so that a man other than the regular substation inspector can take care of the daily charging of the arresters. In such case the arrester equipment could be located out of doors, where it would be much more conveniently accessible.

A thorough inspection of all the equipment should be made not less than once a week, unless experience has demonstrated in a particular case that a thorough inspection only once every two weeks is sufficient. Between inspections, visits would simply be in the way of a general survey, whereas the thorough inspection would require two or three hours at least and the filling out of a suitable inspection report.

On the system of the Des Moines City Railway a form is used which requires answers to some 192 questions, most of which can be quickly answered by the word, "Yes." It is strongly urged that every owner of automatic substation equipment should make use of some form of inspection report, however simple it may be.

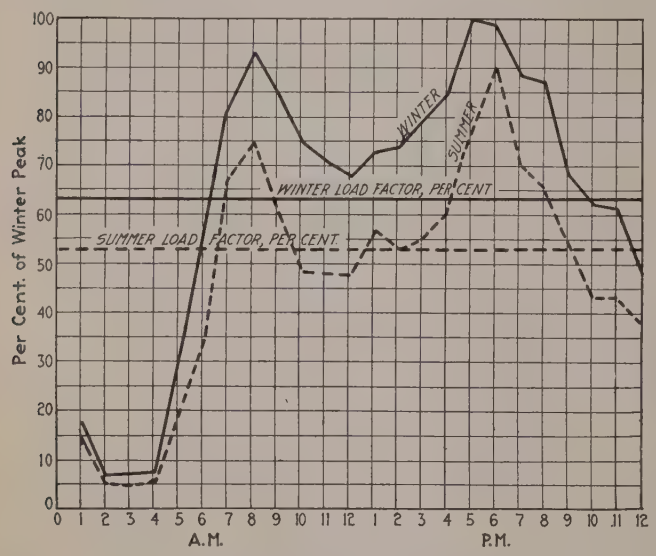


FIG. 1—TYPICAL LOAD CURVES BASED ON SIX POWER PLANTS HANDLING RAILWAY LOADS ONLY

There are two types of control applicable to automatic substations available at present. One makes use of a motor-driven controller and exciter employed for determining the sequence of operations and at the proper time fixing the polarity of the field of the machine to be started. The other system employs a switching equipment, each step in the operation of which is a direct function of the electrical condition of the converting apparatus at that particular moment. The sequence of operations is determined by a suitable combination of inter-connected relays. In starting, if the polarity fails to remain established in the proper direction from the previous operation of the machine, a pole is automatically "slipped" through the action of a specially-constructed relay.

In both systems, relays of both the instantaneous and time-element type are employed, as well as thermostats for protection against overheating of bearing and resistor grids. These grids furnish a load-limiting or cushioning resistance through which the machine is thrown on the line and which limits the load under extreme overload or short circuit. Suitable relays are used to protect the station, preventing it from operating on low alternating-current voltage, reverse phase, single phase or reverse current. They will shut the station down on alternating-current or direct-current short circuit, failure of alternating-current voltage, overspeeding or underspeeding of the machine, or the failure of any device properly to function. The value of several of these protective devices is sufficient to warrant their use in manually-operated stations.

Contract for Purchase of Railway Power

In accordance with its assignment a sub-committee instructed to recommend a standard form of power contract for the purchase of railway power endeavored to do this, but when its preliminary work was submitted to the committee as a whole, it did not prove satisfactory. It seemed impossible with the knowledge at hand to frame up clauses which would be applicable for the purchase of power on

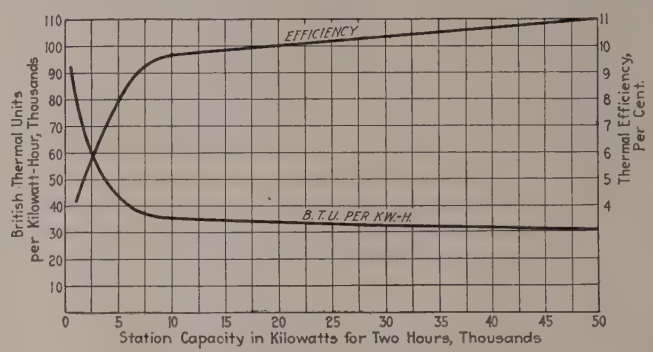

EFFICIENCY
B.T.U. PER KW-H.
British Thermal Units per Kilowatt-Hour, Thousands
Thermal Efficiency, Per Cent.
Station Capacity in Kilowatts for Two Hours, Thousands

FIG. 2—RELATION OF PLANT CAPACITY TO EFFICIENCY

a large as well as a small scale, except for specific cases.

The committee therefore decided to study existing power contracts and select from these such clauses or phrases as seemed best suited to the purpose, presenting these as a suggested form of power contract. Accordingly, copies of contracts were obtained from twenty member companies and excerpts from these were combined under certain headings and sub-headings which together form a topical index. The committee expressed the belief that the compilation includes all of the salient points that, under the usual conditions, it will be necessary to cover in a power contract. Although it is possible from these data to select clauses with which, with certain modifications, particular cases can be met, the committee did not suggest any series of clauses, but set them forth exactly as given.

Operating Performance of Railway Power Stations

The sub-committee on this subject received a total of 117 reply data sheets from member companies regarding power station operation, of which fifty-six gave no data because the companies are purchasing power. Of the remaining data sheets thirty-seven were analyzed and com-

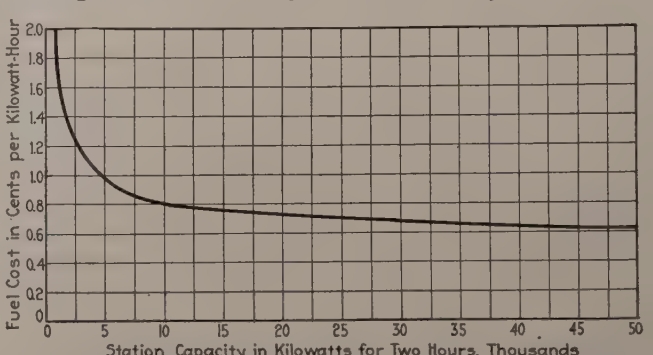


FIG. 3—FUEL COST PER KILOWATT-HOUR, ALL PLANTS CORRECTED TO COAL AT $5 PER NET TON AND 12,500-B. T. U. PER POUND

posite railway load curves were made up from six reports based upon strictly railway load. The composite result is shown in Fig. 1, the data from which it was plotted being weighted by increasing the actual hourly peak of each plant by the ratio between such plant's maximum peak and that of the plant having the greatest peak.

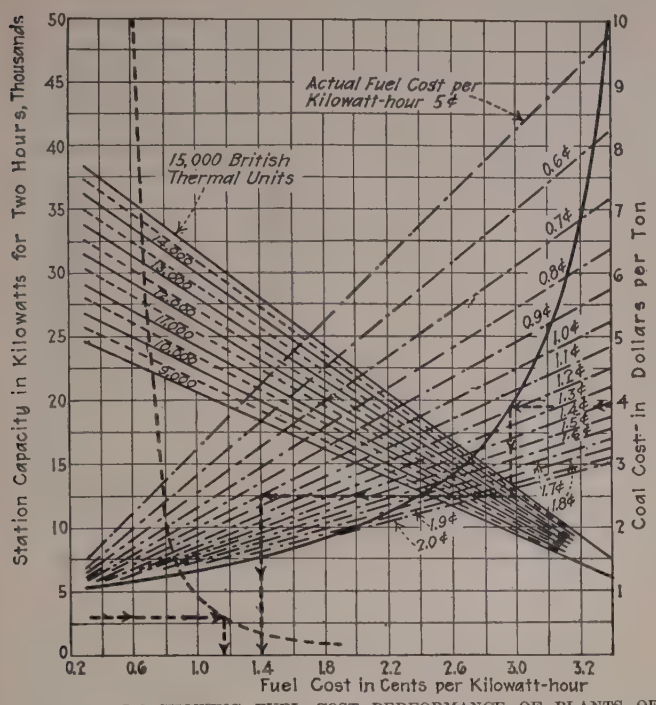

Actual Fuel Cost per Kilowatt-hour 5¢
15,000 British Thermal Units
Station Capacity in Kilowatts for Two Hours, Thousands
Coal Cost in Dollars per Ton
Fuel Cost in Cents per Kilowatt-hour

FIG. 4—CHART SHOWING FUEL COST PERFORMANCE OF PLANTS OF VARIOUS SIZES

Explanation to Fig. 4. Left-hand curve in the diagram shows relation of fuel cost (correcting to 12,500-B. t. u. coal at $5 per short ton) to two-hour plant capacity. Other lines permit graphic calculation and comparison of any plant performances, given coal cost per short ton, B. t. u. value of coal and actual fuel cost per kilowatt-hour.

Example: Assume 3000-kw. plant, $3.90 coal cost per short ton and 13,500-B. t. u. coal. Follow arrows, starting at 3000 kw. on station capacity scale, intersect plant performance curve, then downward to 1.16 cent per kilowatt-hour, giving fuel cost per kilowatt-hour for a 3000-kw. plant as per analyzed result of twenty-five plants.

Comparison: Follow arrows, starting at $3.90, horizontally to curve, then downward to fuel value (13,500-B. t. u.), horizontally to actual fuel cost per kilowatt-hour (1 cent) and downward to corrected fuel cost per kilowatt-hour (1.39 cent).

Assumed plant's performance is not as good as average of twenty-five analyzed plants.

As to operating cost, as the capacities of the plants analyzed ranged all the way from 800 kw. to 50,000 kw., naturally the generating cost per kilowatt-hour shows a wide variation. Fuel cost varies between 75 per cent and 80 per cent on practically all plants, regardless of size. Labor cost, however, shows a wide variation, plants larger than 5000-kw. averaging 17 per cent, decreasing to 11 per cent for very large plants.

The accompanying tables give many data, and are significant in connection with the power-plant efficiency curves shown in Fig. 2. These are based on coal-burning plants only, and these show efficiencies as in Table IV.

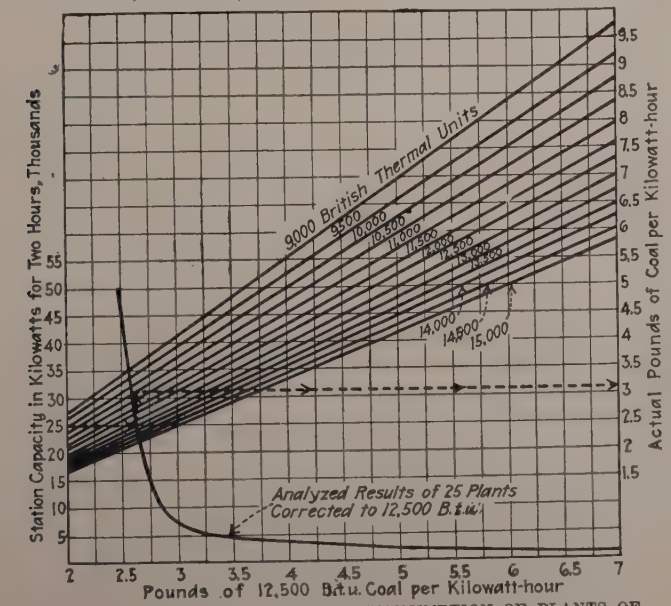

9000 British Thermal Units
Analyzed Results of 25 Plants Corrected to 12,500 B.t.u.
Station Capacity in Kilowatts for Two Hours, Thousands
Actual Pounds of Coal per Kilowatt-hour
Pounds of 12,500 B.t.u. Coal per Kilowatt-hour

FIG. 5—CHART SHOWING COAL CONSUMPTION OF PLANTS OF VARIOUS SIZES

Example: How many pounds of coal should a 25,000-kw. plant burn per kilowatt-hour, assuming fuel value of 10,500 B. t. u.? Follow arrows starting at 25,000 kw., on station capacity scale, intersect analyzed result curve, thence upward to intersect 10,500-B. t. u. line, thence horizontally to the right and obtain 3.12 lb. of 10,500 B. t. u. coal required.

TABLE IV—POWER PLANT EFFICIENCIES

Two-Hour Plant Capacity	B.t. u. per Kw.-hr. Generated	Thermal Efficiency, per cent
Below 1,000, kw.	90,000 to 80,000	About 4%
1,000 to 3,000	80,000 to 56,000	4.0 to 6.1
3,000 to 5,000	56,000 to 43,000	6.1 to 8.0
5,000 to 10,000	43,000 to 35,000	8.0 to 9.6
10,000 to 20,000	35,000 to 33,500	9.6 to 10.0
20,000 to 50,000	33,500 to 31,000	10.0 to 11.0

TABLE V—COSTS OF GENERATING POWER

Two-Hour Plant Capacity	Average Fuel Cost per Kw.-hr. Cents	Average Labor Cost per Kw.-hr. Cent	Average Maintenance Cost per Kw.-hr. Cent	Average Miscellaneous Cost per Kw.-hr. Cent	Average total Cost per Kw.-hr. Cents
Account number	(53)	(52)	(46 & 47)	(45, 54, 55 and 56)	(45, 50, 56 inclusive)
3,000 kw. and less (six plants)	1.85	0.43	0.13	0.15	2.56
Over 3,000 kw. to 5,000 kw. (five plants)	0.96	0.25	0.09	0.15	1.45
Over 5,000 kw. to 10,000 kw. (four plants)	0.77	0.15	0.08	0.05	1.05
Over 10,000 kw. to 20,000 kw. (nine plants)	0.76	0.14	0.10	0.05	1.05
Over 20,000 kw. to 50,000 kw. (ten plants)	0.75	0.11	0.07	0.05	0.98

TABLE VI—COMPARATIVE POWER PLANT DATA

	1918	1916
Net output from bus, kw.-hr.	21,317,432	11,819,040
Maximum one-hour peak, kw.	8,025	4,100
Load factor: av. kw.-hr. to one-hour load	30.3	32.8
Capacity for 2-hr. peak, kw.	9,300	9,300
Plant factor: av. kw.-hr. to two-hour (capacity) load	26.1	14.5
Pounds of coal	96,850,380	66,588,000
Pounds of coal per kw.-hr.	4.54	5.63
B.t.u. as received	11,500	11,500
B.t.-u. per kw.-hr.	52,100	64,700
OPERATING EXPENSES		
Power plant labor (including superintendence)	$52,371	$22,093
Maintenance	11,185	4,973
Fuel	114,788	26,262
Water, lubricants, etc.	9,641	6,936
Total	$187,985	$60,264
Fuel cost per kw.-hr., cent	0.539	0.222
Labor cost per kw.-hr., cent	0.239	0.186
Maintenance per kw.-hr., cent	0.053	0.042
Water, lubricants, etc., per kw.-hr., cent	0.045	0.058
Total cost per kw.-hr.	0.876	0.508

FUEL COST ANALYSIS

As the fuel cost is by far the greatest item of production expense, a special study was made with the idea of getting the approximate relation between fuel cost and station capacity. Fuel cost and B. t. u. values vary greatly at the different plants. It was found, however, that the average cost of coal per short ton, for twenty-five plants, was $4.50. The average B. t. u. value was 11,000 per lb. of coal. This is practically equivalent to coal of 12,500 B. t. u. value at $5 per ton, or 10,000 B. t. u. for 0.2 cent.

The curve shown in Fig. 3 was produced by correcting the actual fuel cost per kilowatt-hour at each plant, and the B. t. u. value of the coal to a coal costing 0.2 cent per 10,000 B. t. u. Thus one plant purchasing 8,202-B. t. u. coal at $3.38 per ton had a coal cost of one cent per kilowatt-hour. In this case the corrected coal cost on the curve would be 0.97 cent.

To enable any plant performance to be compared with the curve, the chart shown in Fig. 4 was prepared. By means of this the actual fuel cost of any plant can be rapidly corrected for various fuel values and costs, and the latter result compared with the cost as found for any particular size plant in the analysis. The example given shows a 3000-kw. plant, burning 13,500-B. t. u. coal which cost $3.90 per short ton, for which the fuel cost is 1.39 cents. This performance is not quite as good as that shown from the analyzed returns for a plant of 3000 kw., the figure for this plant being 1.16 cents.

Another chart, Fig. 5, was prepared to permit the making of a comparison between the consumption of a plant, corrected to 12,500-B. t. u. coal and that of a plant of similar size. The example given on the chart shows that a 25,000-kw. plant, burning 10,500-B. t. u. coal, should burn 3.12 lb. per kilowatt-hour. Actual performance of a given plant can be compared with this.

This report on power generation matters was signed by A. B. Stitzer, chairman, and Howell Van Blarcom, C. R. Greenidge, E. H. Scofield, R. W. Eaton, C. W. DeForest, W. C. Slade, E. Gould, E. P. Waller, and A. B. Kelsey.

Discussion on Power Generation

In the discussion which followed, L. P. Crecelius, Cleveland Railway, spoke of the advantages of automatic substations and said that his experience showed that these advantages are more pronounced than those given in the report of the committee. For automatic substations of 6000 kw. and larger the labor item is such a small per cent of the power cost that the initial cost proves to be a disadvantage. C. M. Davis, General Electric Company, outlined the progress that had been made in the design of automatic substations and stated that this progress made in the design of automatic substations had been very rapid since 1915. Eighty equipments have been sold by the two manufacturers of this type of equipment and there are fifty to fifty-five equipments in operation. The largest capacity so far for converters is 1500 kw., and 2000 kw. is the largest for motor-generators. C. F. Lloyd, Westinghouse Electric & Manufacturing Company, spoke of the reliability which had been manifest in the operation of automatic substations and considered that their development had come at a very opportune time, as the labor situation at present is in its worst stages and also the financial condition of electric railway properties is very bad. Mr. Davis said that operating men in considering the use of automatic substations first thought only of the savings in wages which would result from having no operator. There are other savings and advantages, however, which appear of even greater importance when considered as a whole. Some of these are the continual availability of the system for the delivery of power in night or day and the facility for relocating substations without regard to the desirability of their location as concerned the operator. There is also a shut-down saving which comes from the elimination of light-load losses. Substations can be built for either remote control, time-clock control, or a combination of several other conditions, as encountered.

L. D. Bale, Cleveland Railway Company, spoke of heavy and light current-limiting resistances and asked some of the manufacturing engineers to explain how the question of the type of resistance was determined. In answer to this question, Mr. Davis said that where light resistance was used in the feeder, the resistance would heat up rapidly and the circuit in trouble would be disconnected quickly. For operating conditions, where it may be desirable to furnish power to a feeder in trouble as long as possible, a heavy resistance is the proper type to use, as this affords a means for keeping cars moving at reduced speed, so as to get them out of the zone of trouble, before the circuit was interrupted. The choice of which type of resistance to use is more a question of how the operator wishes to run his cars than a question of the equipment to be furnished by the manufacturer.

In discussing the form of power contract for the purchase of railway power as given in the report, Mr. Crecelius thought it highly desirable that this subject be referred to the power generation committee for the ensuing year. R. W. Eaton, public service engineer, stated that the committee did not have this work assigned until the middle of March and the time was insufficient properly to analyze the work which has already been done, or to select material for a suggested form. The committee felt, however, that the subject is of sufficient importance to warrant it in recommending to the association that the subject be reassigned to the power generation committee for the ensuing year with a suggestion that additional power contracts be analyzed and that if possible a suggested form of power contract be deduced from the material thus obtained, together with the data submitted at this time and such further additions as may be thought advisable. Mr. Stitzer closed the discussion with the statement that the committee thought that the various railway companies would be able to use the forms as submitted to draft power contracts that would suit their individual conditions and thus the work which the committee had done this year would be of service to many railways. The report of the committee on power generation was adopted by the association.

Equipment

The association then took up the consideration of the report of the committee on equipment, which was abstracted by Daniel Durie, chairman.

The subjects which were assigned to the committee on equipment for consideration and report, comprised (1) the formulation of a new code for 1200-volt car wiring, (2) the development of check gages and templates for wheel and truck parts, and (3) the standardization of motor parts. The sub-committee to which the second of these subjects was assigned, included in its report recommendations covering the dimensions of steel wheels and the tread and flange contours for cast wheels.

On the formulation of a new code for 1200-volt car wiring, or a revision of the 600-volt code for this purpose, the committee made no report.

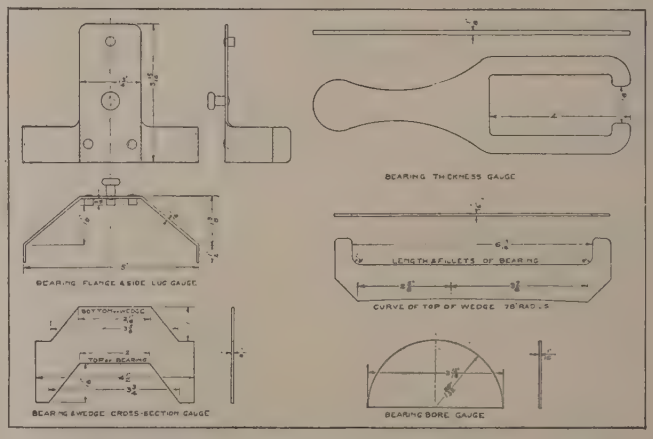

BEARING THICKNESS GAUGE
BEARING FLANGE & SIDE LUG GAUGE
LENGTH AT INLETS OF BEARING
CURVE OF TOP OF WEDGE 78" RADIUS
BOTTOM RADIUS
TOP OF BEARING
BEARING & WEDGE CROSS-SECTION GAUGE
BEARING BORE GAUGE

FIG. 1—PROPOSED STANDARD BEARING AND WEDGE GAGES

On the subject of check gages and templates for wheels and truck parts, the committee prepared the drawings of Fig. 2 showing the terms and gaging points for A. E. R. E. A. wheels and rails. It was pointed out that these drawings had been prepared along the general lines followed by the Master Car Builders' Association. Fig. 3 shows the committee's recommendation for the standard wheel mounting and check gage. No recommendations were made for brake-beam gages, wheel flange and tread contour gage, or standard wheel tape. The committee also recommended a standard plane gage for rolled steel wheels, which is intended for use in checking warping of wheels, the tolerances allowed being governed by the wheel specifications, as well as a recommended standard rotundity gage for steel wheels. This gage is intended to become tight on the wheels at the center of the tread, all standard wheels having a taper of 1 in. in 25 in. The tolerances governing here are included in the wheel specifications. Fig. 1 shows the

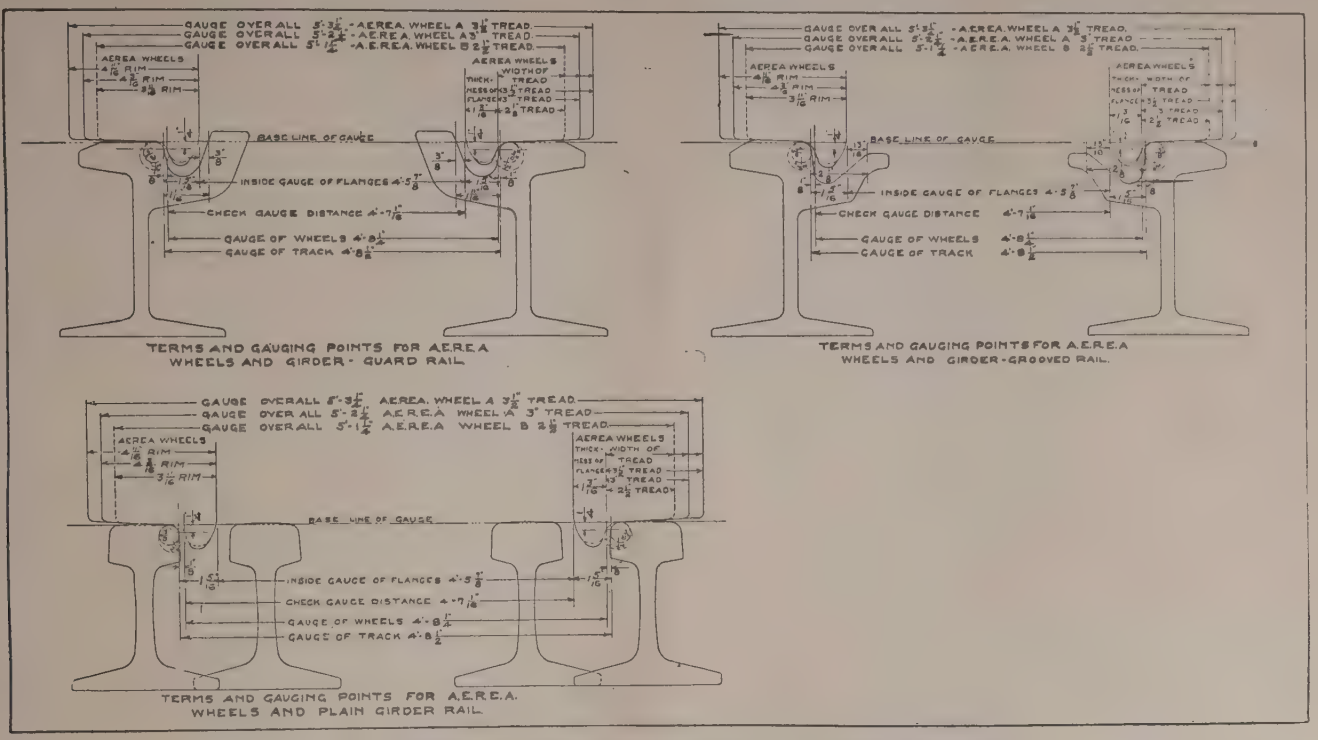

TERMS AND GAUGING POINTS FOR A.E.R.E.A WHEELS AND GIRDER - GUARD RAIL
TERMS AND GAUGING POINTS FOR A.E.R.E.A WHEELS AND GIRDER - GROOVED RAIL.
TERMS AND GAUGING POINTS FOR A.E.R.E.A. WHEELS AND PLAIN GIRDER RAIL.

FIG. 2—TERMS AND GAGING POINTS FOR A. E. R. E. A. WHEELS AND RAILS

different proposed standard gages for use in gaging journal bearings and wedges for $3\frac{3}{4}$-in. x 7-in. journals.

The table on page 78 of proposed specified dimensions for A. E. R. E. A. steel wheel designs was submitted by the committee with the suggestion that it be adopted as standard.

The committee's second recommendation in regard to wheels was that the designs for contours of the cast wheels proposed by the committee of 1916 and then withdrawn, be adopted as standard. The tread and flange contours referred to are shown on page 491 of the 1916 Proceedings of the A. E. R. E. A. They include three standard wheels as follows: Wheel A, having a 3-in. tread and a flange $\frac{7}{8}$ in. high and $1\frac{3}{16}$ in. thick at the throat; wheel B, having a tread $2\frac{1}{2}$ in. wide and a flange $\frac{3}{4}$ in. high and 1 in. thick; and wheel C, having a $2\frac{1}{2}$-in. tread and flange $\frac{5}{8}$ in. high and 1 in. thick.

On the subject of standardization of motor parts, the committee pointed out that this question should be given very careful consideration before standards are adopted in order that such standards may not be of a character to retard development or would not be adhered to, and then recommended that the following items be considered by the succeeding committee: (1) Box-frame motors. (2) Nose suspension. (3) Drilling motor frame both sides for motor leads. (4) Eliminate provisions for grounding on motors.

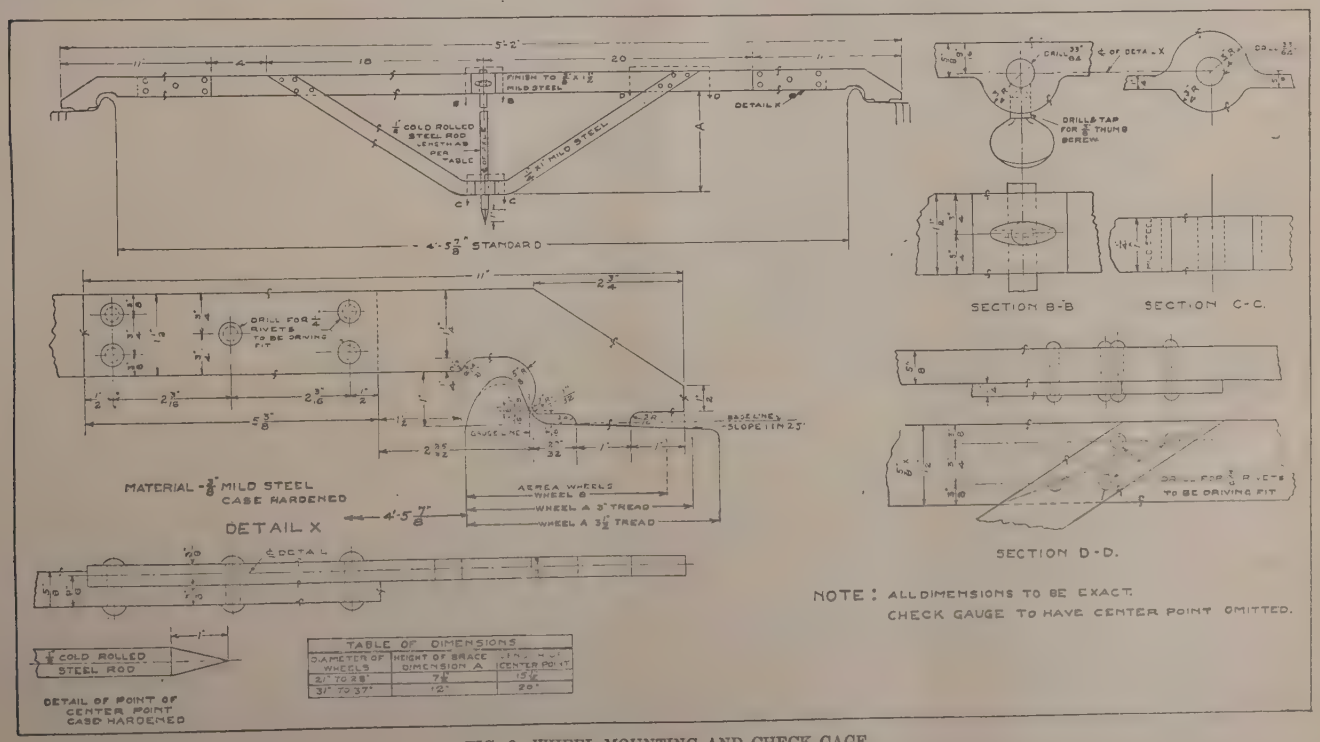


FIG. 3—WHEEL MOUNTING AND CHECK GAGE

(5) Lengths of motor leads. (6) Marking of motor leads. (7) Connectors for motor leads. (8) Continuous locking device. (9) Motor winding diagram. (10) Machining tolerance on axles for motor axle bearings.

PROPOSED SPECIFIED DIMENSIONS FOR A. E. R. E. A. STEEL WHEEL DESIGNS

TABLE I—FLANGE WIDTH $\frac{7}{8}$ IN.

No. of wheel	Diameter Inches D	Flange height Inches a	Flange width Inches b	Throat radius Inches c	Rim width Inches e	Tire thickness Inches d	Hub diameter Inches t	Hub length Inches n	Track-gages: Hub projection, 4′ 8½″ Inches	Track-gages: Hub projection, 5′ 2½″ Inches
1 ..	21	⅝	⅞	½	3⅝	2	7	5	3¼	4¼
2 ..	22	⅝	⅞	½	3⅝	2	7¼	5	3¼	4¼
3 ..	24	⅝	⅞	½	3⅝	2	7¼	5	3¼	4¼
4 ..	26	⅝	⅞	½	3⅝	2	8¼	5	3¼	4¼
5 ..	28	⅝	⅞	½	3⅝	2½	8¼	5	3¼	4¼
6 ..	31	⅝	⅞	½	3⅝	2½	8¼	5	3¼	4¼
7 ..	33	⅝	⅞	½	3⅝	2½	8¼	5½	3¼	4¼
8 ..	34	⅝	⅞	½	3⅝	2½	8¼	5½	3¼	4¼

TABLE II

1 ..	21	¾	⅞	¼	3⅝	2	7	5	3¼	4¼
2 ..	22	¾	⅞	¼	3⅝	2	7¼	5	3¼	4¼
3 ..	24	¾	⅞	¼	3⅝	2	7¼	5	3¼	4¼
4 ..	26	¾	⅞	¼	3⅝	2	8¼	5	3¼	4¼
5 ..	28	¾	⅞	¼	3⅝	2½	8¼	5	3¼	4¼
6 ..	31	¾	⅞	¼	3⅝	2½	8¼	5	3¼	4¼
7 ..	33	¾	⅞	¼	3⅝	2½	8¼	5½	3¼	4¼
8 ..	34	¾	⅞	½	3⅝	2½	8¼	5½	3¼	4¼

TABLE III—FLANGE WIDTH 1 IN.

1 ..	21	⅝	1	½	3½	2	7	5	3⅜	4⅜
2 ..	22	⅝	1	½	3½	2	7¼	5	3⅜	4⅜
3 ..	24	⅝	1	½	3½	2	7¼	5	3⅜	4⅜
4 ..	26	⅝	1	½	3½	2	8¼	5	3⅜	4⅜
5 ..	28	⅝	1	½	3½	2½	8¼	5	3⅜	4⅜
6 ..	31	⅝	1	½	3½	2½	8¼	5	3⅜	4⅜
7 ..	33	⅝	1	½	3½	2½	8¼	5½	3⅜	4⅜
8 ..	34	⅝	1	½	3½	2½	8¼	5½	3⅜	4⅜

TABLE IV

1 ..	21	¾	1	¼	3½	2	7	5	3⅜	4⅜
2 ..	22	¾	1	¼	3½	2	7¼	5	3⅜	4⅜
3 ..	24	¾	1	¼	3½	2	7¼	5	3⅜	4⅜
4 ..	26	¾	1	¼	3½	2	8¼	5	3⅜	4⅜
5 ..	28	¾	1	¼	3½	2½	8¼	5	3⅜	4⅜
6 ..	31	¾	1	¼	3½	2½	8¼	5	3⅜	4⅜
7 ..	33	¾	1	¼	3½	2½	8¼	5½	3⅜	4⅜
8 ..	34	¾	1	½	3½	2½	8¼	5½	3⅜	4⅜

TABLE V—RIM WIDTH 4 IN., FLANGE WIDTH 1 IN.

1 ..	24	⅝	1	½	4	2	7¼	5	3⅜	4⅜
2 ..	26	⅝	1	½	4	2	8¼	5	3⅜	4⅜
3 ..	28	⅝	1	½	4	2	8¼	5	3⅜	4⅜
4 ..	31	⅝	1	½	4	2	8¼	5	3⅜	4⅜
5 ..	33	⅝	1	½	4	2	8¼	5½	3⅜	4⅜
6 ..	34	⅝	1	½	4	2	8¼	5½	3⅜	4⅜

TABLE VI—RIM WIDTH 4 3/16 IN., FLANGE WIDTH 1 3/16 IN.

No. of wheel	Diameter Inches D	Flange height Inches a	Flange width Inches b	Throat radius Inches c	Rim width Inches e	Tire thickness Inches d	Hub diameter Inches t	Hub length Inches n	Hub projection Inches O
1	33	7/8	1 3/16	1/2	4 3/16	2 1/2	9 1/4	6	(2 15/16 or 1 15/16)
2	34	7/8	1 3/16	1/2	4 3/16	2 1/2	9 1/4	6	(2 15/16 or 1 15/16)
3	36	7/8	1 3/16	1/2	4 3/16	2 1/2	9 1/4	6	(2 15/16 or 1 15/16)

TABLE VII—RIM WIDTH 4 11/16 IN., FLANGE WIDTH 1 3/16 IN.

1	34	7/8	1 3/16	1/2	4 11/16	2 1/2	9 1/4	6	(2 15/16 or 1 15/16)
2	36	7/8	1 3/16	1/2	4 11/16	2 1/2	9 1/4	6	(2 15/16 or 1 15/16)

NOTE. Minimum rough bore 3⅜″, Tables I, II, III, IV and V.
NOTE. Minimum rough bore 4¾″, Tables VI and VII.

The report of the committee was signed by Daniel Durie, chairman, and W. G. Gove, vice-chairman, and the following members: H. A. Johnson, R. H. Dalgleish, N. B. Trist, K. A. Simmon, E. D. Priest, W. S. Adams, G. W. Lyndon and J. M. Bosenbury.

DISCUSSION ON EQUIPMENT

Norman Litchfield, American Car & Foundry Company, said that from his consideration of the drawing showing the proposed gages to be used as standard in gaging A. E. R. A. journal bearings and wedges, he believed these were the same as those which had been adopted by the Master Car Builders. He thought that there would be an advantage if this was so stated in adopting the specifications, as frequently manufacturers had to supply material to a specification which they believed was similar to some other on which they were already supplying material, and in order to make certain of this, the various specifications had to be checked over carefully. If a statement was included at the beginning of the specification, when they were identical with another, it would save all this extra work. C. R. Harte, Connecticut Company, objected to labeling A. E. R. A. standards as coming from any other association. He said that as far as their use for electric railways was concerned they should be called A. E. R. A. standards, but he agreed with Mr. Litchfield that full credit should be given as to any part taken from other associations, and any explanation should be included which would save work on the part of those who had to go over these specifications in supplying material.

In answer to a question regarding the tread and flange contours for wheels which were included as a part of the recommendations of the committee, R. H. Dalgleish, Capital Traction Company, said that these contours could be used for both steel and chilled wheels, as far as the base line. H. H. Adams, Chicago Surface Lines, said that from his experience he thought that if a ⅞-in. flange was used with chilled wheels there would be excessive chipping. Mr. Dalgleish said that this was undoubtedly true and that the ⅞-in. flange had only been included for roads which were forced to use this through necessity and that other roads should use the thicker flange if their conditions permitted. Mr. Dalgleish also said that he thought chilled iron wheel manufacturers should be given an opportunity to criticize the proposed standards, but so far the committee was unable to get a man from the manufacturers of chilled iron wheels to serve on the committee.

The association approved the tread and flange contours as recommended and referred these to the standards committee for action.

STANDARDIZATION OF MOTOR PARTS

In regard to the committee's work on standardization of motor parts, Karl A. Simmon, Westinghouse Electric & Manufacturing Company, said that the time in which the committee had to go over these was so short that it was impossible to make definite recommendations, but there were undoubtedly at the present time quite a number of parts which would permit of standardization. E. D. Priest, General Electric Company, also spoke of the advisability of standardizing motor parts, but said that the age of development had not yet passed and that any attempt at standardization should be given very careful consideration, and he thought that it would be a mistake to adopt any part as standard until the committee was given more time to go into the various considerations very carefully. Mr. Adams said that he felt that there was certainly a great field for standardization of motor parts and that many roads were already effecting such standardization on their particular properties. This related particularly to the use of one type of gear case on several types of motors, and

also some roads have found that they could use the same bearings on different types of motors with slight changes.

The association then adopted the recommendations of the committee on equipment as included on pages 11 and 12 of its report and referred the parts which had not already been acted on by the standards committee to this committee for action.

BRAKESHOE STANDARDIZATION

F. W. Sargent, American Brake Shoe & Foundry Company, gave considerable information regarding the number of different parts of brakeshoes other than association standards which are now in use. He said that considering only the live patterns from which his company had made shipments of brakeshoes since Jan. 1, 1918, the total number of such patterns for electric railway brakeshoes was 646, of these 438 are from non-standard patterns; 208 of these take A. E. R. A. standard brake head and key, and of these 208, 183 have been replaced by the American Brake Shoe & Foundry Company's standard patterns, which take the A. E. R. A. standard brake head, ninety-eight patterns being for narrow tread wheels and eighty-three for broad tread wheels. Two patterns have been replaced by the M. C. B. standard flanged brakeshoe, broad tread. There are still twenty-five patterns which take the A. E. R. A. standard brake head, which have not been replaced by the American Brake Shoe & Foundry Company's standard patterns.

Mr. Sargent said that while a great many of the railroads, particularly the larger systems, have adopted the A. E. R. A. brake heads there still remains quite a difference in the wheel contour, so that his company has not been able to standardize on the A. E. R. A. tread outline for brakeshoes. The American Brake Shoe & Foundry Company's standard patterns differ from the A. E. R. A. standard patterns in having the end guides omitted from the brakeshoes. This enables the railroads to use a solid-end-plate brake head which is an improvement over the present association standard and is more economical than the brake head with the open toes which wear out rapidly. The American Brake Shoe & Foundry Company's standard patterns were exhibited in the A. E. R. A. standards booth and also in the company's booth, and Mr. Sargent said he would be very glad to have all interested railway men make a careful examination of these and give him their comments and suggestions.

Mr. Adams said that he thought the subject of standardization of brakeshoes was a very important one and afforded a large field for economy, and he moved that the subject of the revision of brakeshoe and brake head standards be referred to next year's committee on equipment for consideration. This motion was adopted by the association.

Construction Work in France

The latter part of the Tuesday afternoon session was taken up with an address of information and inspiration by Col. Henry Hodge, consulting engineer, New York City. His topic was "Construction Work in France," and he outlined the work that had been done by the American engineers from the time they first landed in France up to the signing of the armistice.

Wednesday's Session

In opening the third session of the Engineering Association, President Phillips dwelt at considerable length on the standardization drive that has been started by the association. He requested all members present to give the subject careful attention and asked that they spread the information brought out in this connection among others so as to try to create the interest that the subject really deserved.

Buildings and Structures

The first report of the afternoon was that of the committee on buildings and structures. This report was presented in abstract by C. S. Kimball, chairman, who said in part relative to the three subjects assigned for investigation and report by the executive committee as follows:

As to the subject of fences using concrete posts and methods of their casting, the committee stated that, based on tests and investigations it would seem that in the manufacture and use of concrete posts the following conditions should be considered: It cannot be expected that concrete posts can be made and transported to the point of use at a first cost which will compare favorably with wooden posts, but if a concrete post is properly built and has a sufficient amount of reinforcement its life should entirely justify the cost. Mortar used in this class of work should never exceed the proportion of two parts of sand to one part of cement, the aggregate not to exceed four parts, preferably 2.5 parts of small broken stone or $\frac{1}{2}$-in. pebbles. Posts should have a diameter of not less than 5 in. at the ground line and four $\frac{1}{4}$-in. steel reinforcing rods so placed as to be approximately $\frac{1}{2}$-inch. from the outer surface of the post. At least sixty days should be given the raw posts to cure before they are placed in the ground. Posts should be set with 14 ft. centers as a maximum.

The committee upon investigation found that in open storage carhouses at least 20 per cent of the carhouse trackage should be equipped with pits and that this percentage of space was sufficient only under the most favorable conditions of track layout for shifting cars. Where all cars are stored under cover and with no easy facilities for car shifting, the pit capacity should be increased to 30 or 40 per cent.

In a model house of 100 to 130 cars capacity, which includes accommodations only for the inspection and repair men, a pit capacity for thirty-two cars should be provided. The pit room should have suitable arrangements for changing motors and wheels, lifting car bodies and other facilities for making minor repairs, including a blacksmith shop, power drill and grindstones. There should be one body hoist to about every forty cars stored and this should be located where a car can be kept on the hoist for several days without blocking storage berths. At larger stations where a number of body hoists would be required, an overhead crane spanning two or three tracks, capable of lifting at least one end of a car, will often be found more convenient. Where body hoists are used, a jib crane should be located at each end of the car to facilitate handling of heavy truck parts, and an overhead telpher is likewise desirable for handling wheels and other heavy parts that are stored outside of the building proper. The blacksmith shop and stockroom should also be conviently located.

Pits should be from 4 to 5 ft. in depth, averaging 4 ft. 6 in. Track centers depend on the method of handling car repair work and for ordinary repairs and inspection should never be less than 11 ft. and preferably 12 ft., where there are no aisle posts. Where there are posts the standard allowed by the Underwriters is the width of the car plus 4 ft. This is also the maximum distance between cars allowed by the Underwriters for one row of aisle sprinklers. The space between a side wall and the nearest rail should not be less than 5 ft. 6 in.

In repair shops where extensive work is done in addition to inspection, a track spacing of 13 ft. is recommended, where there are no aisle posts and where posts come between tracks it should be on 14 or 15 ft. centers. Tracks should be 6 ft. 6 in. from side walls. This spacing is necessary to

allow plenty of room around the car for working, placing material, installing body hoist and jit cranes, fire apparatus, etc.

The four distinct designs of pits can be classified as follows: (a) Pits with main floor level with top of rail and extending from rail to rail; (b) pits with main floor level with top of rail with an open space left between rail and walk designated as "flush skeleton" type; (c) pits with main floor dropped below level of rail and extending from rail to rail, designated as "dropped floor" type; (d) pits with main floor dropped below level of rail with open space between walk and rail, designated as "dropped skeleton" type.

Type (a) is the original and most commonly used type in all carhouses. The other types have developed from necessity due to locating many parts of the air-brake equipment, etc., on the under side of the car in such a position where it can only be reached readily by means of a dropped floor and, with comfort to the workman, by providing leg holes at the side of the walk. The extent to which the several types of pits should be used must largely depend on local conditions, but it is recommended that at least one pit shaft be of the skeleton type, either flush or dropped type. Some roads find that a drop skeleton type of floor throughout works out very satisfactorily, except around body hoists and cranes where a flush floor proves more satisfactory. The extent of the drop to the floor and the open space to allow must also meet with the local conditions.

Rules for Carhouse Wiring

This subject was jointly considered with the electrical committee of the National Fire Protection Association and a set of ten rules were formulated for adoption as recommended practice. These rules, which cover in detail location and suspension of trolley wires, cutouts, line breakers, third-rails, motive-power equipment in shops, etc., have been considered by the committee on standards and their adoption as submitted was approved.

The report was signed by C. S. Kimball, chairman, and F. F. Low, vice-chairman, and the following as members: H. G. Throop, James Link, R. C. Bird, H. R. Whitney and H. E. Funk.

Discussion on Buildings and Structures

C. R. Harte, Connecticut Company, asked the chairman if the statement of the committee that reinforcements for concrete posts should consist of at least four ¼-in. diameter steel rods should not have "or their equivalent" added. This was answered in the affirmative. R. B. Fisher, Buda Company, said that concrete poles and posts will undoubtedly be less used by steam roads in the future than they are at present as steel posts are rapidly coming into favor.

M. Schreiber, Public Service Railway of New Jersey, referred to the rules for carhouse wiring as given in the committee's report and said that the old rules of the National Fire Protection Association are obsolete while the rules now submitted by the committee as a result of its co-operation with the electrical committee of the National Fire Protection Association are a decided advance. If these are adopted they will be printed as the rules of the National Fire Protection Association and their universal distribution will be assured.

H. H. Adams, Chicago Surface Lines, said that it was his understanding that the recommendation of the standards committee for increasing the voltage limit from 700 to 750 had been accepted by the National Fire Protection Association. This was confirmed by the chairman.

The report of the committee on buildings and structures was then approved by the association with the substitution of 750 volts for 700 volts in all places where this occurred in the rules for carhouse wiring.

Way Matters

The report of the committee on way matters was presented by Chairman C. H. Clark. The first question assigned to the committee—that on bolted frogs and steam railroad crossings—received considerable attention and definite specifications were made.

Mr. Clark said that the subjects assigned by the executive committee had been fully considered. A new specification for bolted frogs and steam railroad crossings had been prepared, which had already been approved by the committee on standards as a recommendation. These specifications are intended to cover the manufacture of special track work, wherein frogs, crossings, curves, guard rails and connecting rails are made principally of rolled steel rails properly shaped by machinery or grinding and secured together by means of cast iron, cast, forged or rolled steel fillers, bolts, rivets and plates, conforming in every respect to the association's specifications for materials for use in the manufacture of special track work. (Engr. Man. Ws 4b.)

Grooves, flangeways and gage must conform also to the association's recommendations (Engr. Man. Ws 2a.) with the following allowable tolerances:

	Under	Over
Width of flangeway	None	3/32 in.
Depth of flangeway	1/16 in.	3/16 in.

If M. C. B. wheels are used the flangeways should be 1¾-in. in width and depth. Flange bearings wherever possible should be carried to a point where the wheel will not have less than a 2-in. tread bearing, the effective slope of the risers being $\frac{1}{32}$ in. in 1 in. and not steeper than $\frac{1}{16}$ in. in 1 in.

A tread clearance of 4 in. for A. E. R. E. A. wheels and 4½ in. for M. C. B. wheels is provided. Compromise rails instead of compromise joints are recommended for use wherever possible. If the joints are used they must conform to the association's practice (Engr. Man. Ws 3a). The specifications also cover details for frog and crossing arms, frog points, body fillers, wing rails, springs and spring housings, bearing plates, stops and hold downs for spring rails, and different types of composite and insert crossings.

With regard to the development of a spiral for use in the design of switches, mates and frogs, the designs proposed, although simplifying the manufacture of special work, failed to meet the objections offered by some members of the committee. A sub-committee was appointed to meet with the manufacturers to decide on a spiral that could be universally adopted. [This matter is referred to further in the discussion.]

The development of hand and power tools for track construction was covered by previous committees in some detail. It was the opinion of the committee that to make a report of material value, it would be necessary thoroughly to describe each of the many kinds of hand and power tools which are on the market; then to compare the efficiencies of those used for the same purpose, taking into consideration the different conditions that arise on account of the geographical location of the properties and the varying municipal ordinances and traffic conditions restricting the space in which the work has to be performed. To make such a study would require more time than has been allotted. It would also be necessary to collect extensive data on each type of tool in order to warrant drawing conclusions that would withstand the controversy and criticism naturally brought forth by competitors.

The committee also stated that rapid advances in the cost of labor during the last few years made it more than ever necessary to use labor-saving devices and it was important to select the proper tools with which to do a particular piece of work. As a rule, way department engineers are thoroughly alive to the necessity of using all available kinds

of labor-saving machinery and tools which can be applied to railway working conditions, in order to keep maintenance costs within reason. The use of these devices, however, cannot be exactly the same on any two properties and their selection should be controlled very largely by local conditions. The committee called the attention of engineers to the following tools to reduce labor costs, as well as to expedite their work: (1) crane cars, dump cars, flat cars, pavement plows and steam and electric shovels. (2) Yard equipment, including derricks, yard cranes, locomotive cranes, buckets, rock crushers and creosoting plants. (3) Rail grinders, bonding machinery, tools for bolting and riveting rail joints and power drills. (4) Concreting and paving machinery and power tie tampers. (5) Welding and cutting tools. (6) All hand tools not included in the above list.

The fourth subject considered related to the use of a curved head for girder rails, with special reference to wheel and track wear. The committee stated that some of the obtainable advantages are: The wear on the head of the rail is considerably reduced per car-mile, it eliminates the tangs of the gage line, it increases tractive effort and it causes less flange wear. The report gives a list of companies using curved-head rails and also states that one company tilts T-rails in a ratio of 1 to 25 to obtain the same result.

The report was signed by H. C. Clark, chairman; A. E. Harvey, vice-chairman, E. M. T. Ryder, William R. Dunham, Jr., H. Fort Flowers, W. F. Graves, C. G. Keen and N. B. Trist.

Discussion on Way Matters

The discussion was opened by Victor Angerer, William Wharton, Jr., & Company, who suggested a few typographical changes and said that the specifications seemed very satisfactory. R. B. Fisher, the Buda Company, suggested that with spring frogs the spring should be as close to the frog point as possible and that the distance should be less than the 12 in. specified.

R. C. Cram, Brooklyn Rapid Transit Company, said that most of the specifications with the exception of the section on composite and insert crossings were already in the Manual and that to adopt the complete report would mean the addition of much reading matter already included. To this Chairman Clark replied that the committee had worked only on specifications assigned to them. The specifications were referred back to the committee on way matters for revision.

The second question referred to the committee covered the development of a system of standard spirals. This was handled by a sub-committee and reported by E. M. T. Ryder, Third Avenue Railway, with the assistance of several blueprints and drawings. Mr. Ryder said that nearly all existing systems are based on Searles spirals and that with the system proposed by the committee all angular functions remain constant and that only the arc length varies. The question is whether the members and manufacturers want a uniform system; whether if adopted the system will be used and whether the particular system suggested is desirable.

L. C. Datz, American Cities Company, stated that he believed standards along this line should be adopted and expressed a desire to hear from the manufacturers. R. B. Fisher said that the manufacturers would be glad to make a spiral adopted by the association. Mr. Angerer said that standard spirals would be very desirable. Even if the manufacturers' various standards could be eliminated and some recommended spirals of the association used when not otherwise specified by the railway, it would be an excellent thing. The question as to whether the spiral should be figured from the inside rail may still deserve some consideration. The present proposed spirals are very good, said Mr. Angerer, and are better than those formerly proposed. This system does not involve the use of any more materials than those spirals now in use.

There is no question, said Charles R. Harte, but that if all manufacturers made only one system of spirals, everyone would be better off. If the railways will buy the adopted standard, the manufacturers can soon amortize their old eqiupment. The practical application of the proposed spirals is the question. Is the spiral one with which the field engineer can easily figure out the clearance points? There will be no more trouble with these than with those now in use, said Mr. Clark. The proposed spirals, said C. S. Kimball, are very simple as compared with those now in use.

In reply to a question from William R. Dunham, Jr., New York & Stamford Railway, as to how the proposed spirals would fit in with old work, Mr. Ryder said that the switch cannot be renewed without renewing the mate. It is, however, possible to make partial renewals without difficulty. F. R. Phillips, Pittsburgh Railways Company, president of the association, expressed gratification at the success of the work of the committee and it was moved that he subject be continued and the thanks of the association extended to Mr. Ryder, the manufacturers and other members of the committee.

It was then suggested that the topic of the use of a curved head for girder rails be reassigned to the committee. The general report of the committee was accepted.

It had been expected that Maj.-Gen. William J. Snow would address the convention on the subject of "Field Artillery," but he sent his sincere regrets at being unable to be present through no fault of his own.

Thursday's Session

The Thursday session of the Engineering Association opened with the report of the committee on standards. This was presented by H. H. Adams, chairman, superintendent of shops and equipment, Chicago Surface Lines, and will be found in abstract below.

Engineering Standards

In concluding his report on the standards work Mr. Adams said that some of the reports received for consideration by the standards committee were referred back to the originating committees for changes. These changes have been made and acted upon by the association at its convention meetings and the standards committee will act on these reports at its next regular meeting, which will be held some time after the convention closes.

The work done during the past year by the committee on standards as it refers to the standards and recommendations submitted by the various standing committees is contained in the abstracts of the specific reports. With reference to other matters in its report it says in part, in reference to furthering the use of association standards and recommendation, that a concerted effort should be made by all parties interested to make greater use of the valuable standards and recommendations that have been passed by the association. The committee on standards takes this opportunity to point out to the manufacturers the fact that they can be of great assistance in advocating with customers the use of the standards wherever they can be introduced. They could also greatly assist in this problem if in their catalogs they would show the associations standards and recommendations.

An exhibit showing many of the association standards and recommendations was made at the convention, the manufacturers having offered to furnish exhibits for this

purpose. In addition there were on exhibition various pamphlets covering the specifications which have been passed by the association, either as standards or as recommended specifications.

The committee urged that a strong propaganda be carried on by the members of the association in an endeavor to "sell" the results of the association's work along the lines of its standards and recommendations, and expressed the conviction that if the standards and recommendations are put into general use, both the member companies and the manufacturers will benefit by working to a more uniform practice.

The report is signed by H. H. Adams, chairman, and Martin Schreiber, vice-chairman; John Lindall, E. R. Hill, C. G. Keen, A. B. Stitzer, E. J. Blair, John Leisenring, H. H. Norris, N. W. Storer, Norman Litchfield, E. D. Priest, W. C. Starkey, N. B. Trist and R. C. Taylor.

Discussion on Helical Gearing

Mr. Adams said that there was another subject which he wished to bring to the attention of the association, which was in connection with the new development and use of helical gearings. He referred to several exhibits of this gearing, which were made at the convention, and said that each type of gearing differed from the other in certain respects. He believed that this should prove a very fruitful field for investigation and perhaps standardization, and he recommended that the committee on equipment follow the development of helical gearing and report at the next convention. This recommendation was adopted.

E. D. Priest, General Electric Company, said that the subject of helical gearing was a very interesting and important one. There appeared to be no helical angle that is the best for all purposes, but it may be that future investigations will show that it may be possible to utilize some common helical angles that will serve all purposes, or perhaps several may be necessary. He considered that standardization was very important, and as the cost of tools for manufacturing helical gearing is somewhat in excess of that for the usual type of spur gearing, any developments that are sure to take place would cause an investment that would shortly become obsolete. He said that the question of standardization required careful consideration and should be studied from both theoretical and practical standpoints.

Mr. Adams again referred to the interest in the results which were being obtained through helical gearing, and he said he believed if more railway companies could put this type of gearing into test service, it would help to get practical results sooner and aid considerably in the development.

E. S. Sawtelle, Tool Steel Gear & Pinion Company, said that several months ago his company had suggested to the American Gear Manufacturers' Association that a tentative standard for helical gearing might be adopted. He believed that the general considerations were the same for this association and he thought that action along a similar line would be advisable.

The report of the committee on standards was then accepted by the association.

Resolutions and New Officers

The report of the committee on resolutions to the American Electric Railway Engineering Association for 1919 was presented by H. H. Norris, chairman. Appreciation was expressed of the efforts of President F. R. Phillips, Secretary-Treasurer E. B. Burritt, and special mention was made of the services of J. W. Welsh, recently appointed as special engineer of the association.

It was resolved to express the thanks of the association to the manufacturers who spared no pains in demonstrating their latest technical developments, to Col. Henry Hodge and Nelson W. Storer for their instructive addresses and to the various technical committees of the association for the excellent character of the reports which were submitted for consideration.

As the members of the Engineering Association in attendance at this convention reported for registration with commendable promptness and thereby made possible the satisfactory and expeditious procedure of this convention, it was resolved that a record of appreciation should be made and a continuation of the same practice urged. Resolutions of appreciation were also adopted regarding the entertainment features which had been provided and thanks were extended to the citizens of Atlantic City who had contributed to the pleasure of the members of the association. A resolution of regrets was introduced into the record regarding the loss by death of esteemed and valued members whose names are recorded in the association's office, and it was resolved that the association extend to the families and friends of such deceased members the sincere and heartfelt sympathy of all.

The committee on nominations then made its report and the following officers were elected for the ensuing year: President, E. R. Hill, Gibbs & Hill, New York City; first vice-president, W. G. Gove, superintendent of equipment Brooklyn Rapid Transit Company; second vice-president, C. L. Cadle, chief engineer New York State Railways, Rochester; third vice-president, C. S. Kimball, engineer way and structures, Washington Railway & Electric Company; members of executive committee, C. F. Bedwell, assistant engineer Public Service Railway; H. A. Johnson, superintendent shops and equipment Metropolitan West Side Elevated Railway, Chicago; L. C. Datz, engineer American Cities Company, Birmingham; E. H. Scofield, engineering of power and equipment Twin City Rapid Transit Company Minneapolis.

John H. Pardee, president of the American Association, made a few remarks in appreciation of the work which had been produced by the Engineering Association during the past year. He referred particularly to the work done by the various committees in regard to standardization and said that this would give the industry real results and aid in substantial progress. He considered the work of the Engineering Association as forming a very important part and he commended the spirit of co-operation which has been shown.

N. W. Storer, general engineer Westinghouse Electric & Manufacturing Company, then read a very interesting paper entitled "Electric Motor vs. Gasoline Motor in Street Railway Service." An abstract of this paper appears on another page in this issue.

The installation of the officers then took place. In taking the chair, the newly-elected president, E. R. Hill, thanked the members of the association for the honor which had been conferred upon him, and he said that he realized the seriousness of the responsibility and that he would do his best to get under these and take the load. He felt that the success of the association depended principally on the individual effort that is given to association duties by its various members, and he urged that more members take active part on committees and the work of the association.

The meeting then adjourned.

R. E. McDOUGALL
President

Claims Association Proceedings

At Four Well-Attended Sessions the Discussion Centered Largely on Accident Reduction, Both From the Standpoints of Public Safety and Operating Requirements—Mr. McDougall Set in Motion a Plan for Promoting Co-operation Along This Line Between Municipalities and Electric Railways—A Reclassification of Accidents and Their Causes Was Also Agreed Upon—S. B. Hare Was Elected President

S. B. HARE
President-Elect

THE minutes of the sessions of the American Electric Railway Claims Association convention will be given in more detail in a later issue, together with abstracts of the papers presented. There follows, however, a résumé which will indicate to those not in attendance at Atlantic City that a highly successful meeting was held.

R. E. McDougall, claim agent New York State Railways, Rochester, N. Y., president of the association, presided at all four sessions, held on the afternoons of Monday to Thursday, inclusive. The sessions were held in Claims Hall in the Annex, on the Pier, a room seating 125 persons. While not crowded, the room was comfortably filled at all sessions.

Monday's Session

In opening the convention on Monday, President McDougall paid a tribute to the memory of B. B. Davis, who was secretary of the association from its formation until his death in November, 1917. He explained that thereafter until Jan. 1, 1919, the work was continued by Miss Carrie M. Swartz. J. S. Kubu has acted as secretary since the latter date.

Mr. McDougall pointed out that the last three years have been sore ones for claim agents. The prevailing rate of wages, together with the high cost of living, makes the cost of settlements high today as compared with five years ago. If there ever was a time when claims men could demonstrate that they are a necessary and useful part of their company organization it is the present. Claims men do not have to be told that electric railways are encountering the hardest times of their existence, and it is a question as to how many can continue to operate until the people realize their condition and the necessity for their continued operation so that fair play will be allowed them.

In the past it has been the duty of the claim agent to act for the company on questions of injury and damages, to pass on claims, to protect the interest of the company and at the same time to treat the public fairly. Now he has the added duty of assisting in the prevention of accidents.

For years the number of accidents has been on the increase, and, while there has been considerable work done in the line of accident prevention, so far only the surface has been scratched. Heretofore the work has been carried on by individual companies. While this has been of benefit, none of the men doing the work feel satisfied with what the Claims Association has done along this line. Machinery should be set in motion to carry out accident prevention work so as to produce lasting results.

An organization for this purpose need not interfere with the safety work now being carried on by individual companies. On the other hand, by distribution of printed matter, and at times by suggestions and advice, it can assist the local safety man and his company. It is a question whether this association should "go it alone" or join hands with some organization already studying safety work and devising means for putting these plans into practice.

Mr. McDougall concluded his address by suggesting that a special committee be appointed to work out a plan or plans that can be acted upon at the next convention.

Following Mr. McDougall, E. G. Carpenter read the paper prepared by M. Alves Dixon on "Claim Agents' Experience with One-Man Cars" and L. S. Hoffman read a communication from H. G. Winsor on the same subject.

An important change in the present standard classification of accidents was proposed by William Tichenor and received such favorable consideration that it was accepted and referred back, under the rules, to the joint committee of the Accountants' and Claims Associations on standard classification of accidents and accident accounts. This is covered in this motion made by Mr. Tichenor:

"I move to modify the standardized classification of accidents by striking out Class No. 2 and substituting therefor collisions with foreign cars and trains. To strike out items 4, 6 and 8 of the general classes and raise the sub-classes under them to general classes, giving them consecutive numbers. To raise sub-classes under each of the three general classes so stricken out to co-ordinate classes. Strike out the sub-class I from general class No. 6 as it now stands. Strike out No. E, sub-class under general class No. 4, and substitute therefor man-drawn vehicles. Strike out general class No. 12 and substitute therefor doors, windows, ventilators, gates and guard rails. Add to the list of general classes, runaways, car barns, power houses and substations, stations and freight houses, on the line (overhead construction), on the section, fires, wire accidents, numbering all these classes consecutively so that the standardized classification of accidents will read as follows:

"1. Collisions with pedestrians.
"2. Collisions with foreign trains and cars.
"3. Collisions of cars of company.
"4. Collisions with motor vehicles.
"5. Collisions with horse-drawn vehicles.
"6. Collisions with man-drawn vehicles.
"7. Collisions with animals.
"8. Derailments.
"9. Spread rail.
"10. Broken rail.
"11. Broken brake-beam.
"12. Broken axle.
"13. Broken journal.
"14. Gear-pan dropped.
"15. Flashing controller.
"16. Fuse blown out.
"17. Car barns, power houses and substations.
"18. Stations and freight houses.
"19. On the line (overhead construction).
"20. On the section.
"21. Fires.
"22. Wire accidents.
"23. Boarding cars.
"24. Sudden start.
"25. Sudden stop.
"26. Going around curves.
"27. Fall in car.
"28. Hit by missile.
"29. Hit by passing object.
"30. Hit by passing car.
"31. Hit by falling car parts.
"32. Doors, windows, gates and guard rails.
"33. Alighting from cars.
"34. Falling from cars.
"35. Ejectments and disturbances.
"36. Stealing rides.
"37. Miscellaneous."

After Mr. Tichenor had concluded his remarks, President McDougall announced the appointment as a committee on nominations of H. V. Drown, William Tichenor and W. F. Weh, and one on resolutions of C. G. Rice, E. G. Carpenter and L. S. Hoffman.

Tuesday's Session

The feature of the Tuesday session was a paper by L. J. Tynan, Public Service Railway, Newark, N. J., on "The Advisability of Fixed Schedules for Injuries to Persons Other Than Employees," which was read by the author. His conclusion was that fixed schedules for settling damage cases with the public would result in injustice, and would be contrary to the provisions of the federal constitution. The discussion was scheduled to be opened by E. P. Walsh, United Railways of St. Louis, but he was unavoidably detained. He wrote, however, saying that he indorsed the stand taken by Mr. Tynan.

A snappy discussion was launched immediately after the reading of the paper, showing that the speaker had opened up a fertile field. C. G. Rice, Pittsburgh Railways, took up the topic of the possibility of establishing compensation for passengers at a fixed rate as is done with workmen's compensation. He was followed by John J. Reynolds, Boston Elevated Railway, T. C. Neilson, East St. Louis & Suburban Railway, Ralph Stickle, Cleveland Railway, and William Tichenor, Terre Haute, Indianapolis & Eastern Traction Company.

A resolution of tribute to the memory of B. B. Davis, formerly secretary of the association, was passed. It was expected that a film prepared by the Public Service Corporation for educational purposes would be shown at this session, but due to some mechanical difficulties with the projection apparatus the showing was postponed to Wednesday. This film is entitled "Comrades of Success," and it was produced, first for the benefit of the company's employees, and second for the purpose of exhibition generally throughout the territory served by the company. The picture portrays the desirability of considering safety, courtesy and loyalty, both to the company and its patrons, and points out that several of the officials of the corporation, by careful attention to these three fundamental ideas have reached executive positions.

Wednesday's Session

At the third session of the Claims Association convention President McDougall read a paper on "Organization for Public Accident Campaigns." His purpose was not to favor any particular plan for an organized campaign, but merely to tell the story of what has been done along this line in Rochester, N. Y., during the past two years particularly.

As a result of a campaign in that city, which enlisted the co-operation of all interests, the number of street accidents was materially reduced. In 1912 the Chamber of Commerce appointed a safety committee to endeavor to reduce the numbers of accidents, particularly in industrial plants. The work was fruitful. In 1914 the committee joined with the National Safety Council, and the Rochester Safety Council was formed. The result was a much greater enthusiasm, and finally the present effective campaign for accident reduction was inaugurated in 1918 with a comprehensive organization.

At present the Rochester Safety Council has a membership of 120 firms and corporations, employing nearly 50,000 persons. The results of its efforts are seen in the fact that in 1918 the coroner investigated 140 death cases due to accident as against 166 in 1917, a reduction of 16 per cent. The corresponding figures for the first six months of 1918 and 1919 are fifty-three and sixty-five cases, a reduction of 18½ per cent for 1919.

A comparison of the number of street railway accidents for the years 1917 and 1918 is as follows:

	1917	1918
Collisions with vehicles	2249	1639
Collisions with pedestrians	210	155
Collisions with cars	530	294
Derailments	583	334
Employees injured	291	316
Alighting from car	698	521
Boarding car	719	502
Falling from car	13	9
Injured on car	435	394
Controller trouble	265	153
Electric shock	11	6
Miscellaneous accidents	404	379
Incidents and other	1634	2283
Total	8042	6985

For the first seven-months record for 1918 compared with same period for 1919 shows these results:

	1918	1919
Collisions with vehicles	948	811
Collisions with pedestrians	97	62
Collisions with cars	192	68
Derailments	182	174
Employees injured	189	125
Alighting from car	302	305
Boarding car	265	301
Falling from car	7	4
Injured on car	240	276
Controller trouble	98	46
Electric shock	1	4
Miscellaneous accidents	174	266
Incidents and other	455	741
Total	3150	3183

The discussion on Mr. McDougall's paper was opened up by C. B. Proctor and continued by C. G. Rice, A. G. Jack, S. B. Hare and E. G. Carpenter.

The meeting adjourned early to permit the members to witness a showing of the film "Comrades of Success," already referred to. It was presented by A. J. Van Brunt, Public Service Railway.

Thursday's Session

At the concluding session held on Thursday the Claims Association devoted its attention to an important factor in public safety, the relation of car speed and accidents. E. G. Carpenter read a paper on this subject, the title being "Speed and its Relation to Accidents." His general conclusion was that accidents will increase or decrease largely in accordance with the speed, particularly on city surface lines. Officials were urged to consider this factor in connection with the excessive speeding up of schedules.

The discussion on this paper was opened with a written statement read by the author, H. K. Bennett. E. G. Carpenter and George Carson followed Mr. Bennett, the subject proving to be one which provoked great interest.

President Pardee came into the meeting for a while and complimented the association on the work that it had done.

A committee was then appointed to take up the suggestions as to public safety made by President McDougall, with the idea that a plan for public accident prevention should be produced. The committee consists of Mr. McDougall, chairman, H. V. Brown, H. K. Bennett, W. F. Weh and C. G. Rice.

A resolution was also passed thanking the retiring officers for their efficient work during the war period.

Results of the Election

The result of the annual election which followed was this: President, S. B. Hare, Altoona & Logan Valley Electric Railway; first vice-president, J. J. Reynolds, Boston Elevated Railway; second vice-president, C. G. Rice, Pittsburgh Railways; third vice-president, Wallace Muir, Kentucky Traction & Terminal Company; secretary-treasurer, J. S. Kubu, New York State Railways; executive committee: Howard D. Briggs, Public Service Railway; E. L. Lindermuth, Scranton Railway; C. B. Proctor, Memphis Street Railway; H. G. Winsor, Tacoma Railway & Power Company.

M. R. BOYLAN
President

Accountants' Association Meetings

Interest Centered in the Problem of Using Metal or Paper Tickets with a Frequently Fluctuating Rate of Fare, Such as Is Encountered in Connection with Service-at-Cost Franchises Having Automatic Fare Adjustment Features—Accumulation of Wealth in a Property Through Adequate Depreciation Allowances from the Beginning Is Necessary as Fortification Against Periods of Business Depression—I. A. May Was Elected President

I. A. MAY
President-Elect

THE opening session of the Accountants' Association convention was held on Tuesday, Oct. 7, 1919, in Accountants' Hall with Second Vice-President I. A. May in the chair.

Mr. Boylan's Address

The annual address of M. R. Boylan, president American Electric Railway Accountants' Association, was then read in his absence. He had hoped to be able to be present, but important business connected with the Public Service Railway, of which he is general auditor, prevented his attendance. In his presidential address he said that none regretted more than he, his inability to be at the convention and any disappointment was assuaged only by the feeling that his co-workers would readily understand that his apparent delinquency is due to conditions which were beyond his control.

Continuing, he commented on the fact that the present was the first formal convention in three years; and what a period, he said, the last three years have been—unprecedented in the history of all time. With the whole civilized world turned topsy-turvy, with economic laws set at naught and with a spirit of unrest and uncertainty rampant, the street railway industry has been shaken to its foundations. Unlike other industries, however, the electric railways have not been free to work out their own salvation by passing increased costs on to the consumer. They have had to bear burdens imposed upon them without choice and take the chances of going to state regulatory bodies or other competent authorities to authorize higher rates of fare to augment company revenues.

But railway operators are not so much concerned with the past as with the future—the playing of a part in restoring the industry to its pre-war standing or better, if possible. How that is to be accomplished is a problem that will take the best thought of the ablest minds to solve, and President Boylan expressed the hope that the deliberations of the accountants during this convention would result in helpful suggestions that will enable individual members or individual companies at least to lighten their burdens and minimize some of their troubles.

Commenting on the internal affairs of the association, he said that in June, 1918, he appointed Frank J. Davis acting secretary, to fill the unexpired term of S. C. Rogers, resigned. John J. Landers tendered his resignation as chairman of the committee on accounting definitions, and this committee has since been discontinued. W. C. Ingle resigned as chairman of the joint committee on transportation accounting and A. E. Dedrick also resigned as a member of the committee on accounting definitions.

In conclusion Mr. Boylan expressed his appreciation of the honor of his election as president of the association and hoped that the term of his successor would prove to be a happier and more successful period for both the organization and the industry.

The report of the executive committee was presented by Secretary Frank J. Davis. This report covered in detail the work of the association for the past three years and also included the personnel of the committees for the ensuing year. Secretary-Treasurer Davis next read his report for the period Nov. 1, 1918, to Sept. 1, 1919, covering such expenses as were incurred as well as additions to membership.

The membership of the two convention committees were announced by Acting President May as follows: As members of the committee on resolutions, E. M. White, Binghamton Railway, chairman; W. J. Hughes, Public Service Railway, and H. E. Vordermark, Fort Wayne & Northern Indiana Traction Company; as members of the committee on nominations, T. P. Kilfoyle, Cleveland Railway, chairman; O. H. Bernd, Des Moines City Railway; Arthur M. Curtiss, the Connecticut Company; J. Scott Pardoe, Schuylkill Railway, and F. E. Wilkins, Mahoning & Shenango Railway & Light Company.

Standard Classification of Accounts

The report of the committee on a standard classification of accounts was read in the absence of the chairman by Secretary Davis. The committee stated that since the last report of the committee, the Interstate Commerce Commission under date of May 1, 1917, issued Accounting Bulletin No. 14, which included all of the interpretations of the classifications embodied in the Uniform System of Accounts for Electric Railways.

Since this bulletin was published, there have been submitted a number of additional questions, although during the war they were few in number. From the fact that so few questions have lately been asked it is evident that the standard system of accounts is now pretty well understood and has proved to be satisfactory to the several federal and state commissions and to the accounting companies. The committee plans at some later date to make arrangements to revise the text of the standard system of accounts so as to include all the decisions.

The report was signed by H. L. Wilson, chairman, and P. S. Young, W. F. Ham, W. H. Forse, Jr., and R. H. Wallis.

Acting President May next introduced Earl A. Saliers, professor at Yale University, who presented a paper on "Accounting Measures to Meet Business Depressions." An abstract of this paper is published elsewhere in this issue.

On being questioned by P. L. King of St. Louis as to his opinion of treating interest on unused amounts in deprecia-

tion funds he replied that this depended entirely on how the fund was set up. If by the straight-line method, any accruing interest would revert to the company, while if the fund was based on the sinking fund plan, all interest would be put in the fund. On being questioned by another delegate if any objections had been made to carrying a surplus, he stated that reserves for renewals must be built-up to their proper amounts before any company has the right to carry a surplus.

The meeting then adjourned to the Hippodrome where Clarence R. Bitting, a certified public accountant of Philadelphia, delivered an address illustrated with diagrams and charts on "The Preparation of Accounting and Statistical Data in Connection with Rate Cases." This address is published in abstract elsewhere in this issue. The meeting then adjourned.

Wednesday's Session

The session of the Accountants' Association on Wednesday was held jointly with the T. & T. Association, and a report of this meeting will be found in this issue under the report of the T. & T. Association.

Thursday's Session

The closing session of the Accountants' Association was held in Accountants' Hall with Second Vice-President I. A. May presiding.

The first order of business was a paper by W. A. Doty, Denver Tramway Company, on "Methods of Fare Collection When Frequent Changes in Rates Are Anticipated Under the Cost-of-Service Plan." An abstract of this will be found on another page.

The next paper was by Carl Nau, former city treasurer of Cleveland and at present a certified public accountant, who addressed the meeting on "Accounting as Applied to Municipally-Owned Public Utilities." He referred particularly to a plan of accounting that he had developed to compare municipally-owned and privately-owned lighting plants.

Among other things he said that at one time he strongly urged municipal ownership and operation but that now he had changed his mind and believed that municipal ownership was wrong, the reason being that municipal ownership does not satisfy the prime idea that underlies any industry, that is, selfishness, which is the supreme virtue of mankind and makes for business, in that it creates an incentive to strive to improve and obtain a reward, which is not obtainable in municipal ownership and operation.

He believed that the best plan of operation was the cost-of-service plan having some fixed return. This would work most satisfactorily in gas or electric light work where the service rendered was controlled by the recipient of the service, which is impossible in street railway operation. While the Tayler plan lacks the feature of the recipient controlling the service he nevertheless believed it to be the best plant for railway operation yet devised in the country. In speaking of the return guaranteed under the Tayler plan he stated that if 6 per cent was fair when the plan was adopted then 8 per cent would not be any better today.

The report of the committee on resolutions was not read before the meeting, but will be included in the proceedings. The report of the committee on nominations was presented by T. P. Kilfoyle. The men nominated by the committee were elected as follows:

President, I. A. May, the Connecticut Company; first vice-president, J. J. Landers, York Railways; second vice-president, F. E. Webster, Massachusetts Northeastern Street Railway; third vice-president, W. G. Nicholson, Omaha & Council Bluffs Street Railway; secretary-treasurer, Frank A. Davis, Public Service Railway; members of executive committee, the officers and W. A. Doty, Denver Tramway; P. L. King, San Antonio Public Service Company; F. E. Wilkin, Mahoning & Shenango Railway & Light Company, and O. H. Bernd, Des Moines City Railway. President May then took the chair and called upon each of the newly-elected officers for remarks, which were made briefly.

Manufacturers Take Important Step

Manufacturers' Association Votes to Disband as Soon as American Association Approves President Pardee's Plan

A meeting of the manufacturer members of the American Electric Railway Association was held in the Park Avenue Room of the Marlborough-Blenheim on the afternoon of Oct. 7 for the purpose of determining their attitude toward the promotion of closer relations between the manufacturer and railway members of the association. President J. H. Pardee addressed the meeting explaining that the executive committee proposed a plan whereby the committee will be enlarged by five members selected from among the manufacturers. It was proposed further that nominations for all officers in the association should be made by a nominating committee of seven, composed of four railway and three manufacturer members. Mr. Pardee stated that the American Association would take action relative to the necessary changes in the constitution and by-laws to make this arrangement possible.

President Pardee paid a glowing tribute to the spirit with which the manufacturers had co-operated with the railway members in the work of the association and implied that the present changes simply carry out the spirit which is manifest throughout the association. He said that the matter would have been taken up before but for the cessation of normal association activities during the war period.

Thomas Finigan who presided at the meeting, in introducing Mr. Pardee, traced the development of the past few years in relation to this matter. In response to a question he said that the arrangement proposed by Mr. Pardee would take the place of an affiliated association which had been proposed, for which a suggested constitution had been distributed among the manufacturer members of the American Association.

The members present approved by vote the plan outlined by Mr. Pardee.

After the adjournment of the meeting of manufacturer members of the American Electric Railway Association, Mr. Finigan, as president of the American Electric Railway Manufacturers' Association, called a meeting of that association, for the purpose of taking action regarding the plan outlined by Mr. Pardee in case the American Association should take the action which Mr. Pardee had proposed and which had had the approval of the American Association executive committee. Mr. Finigan explained that the plan had the approval of the executive committee of the Manufacturers' Association which had appointed a committee to draw up suitable resolutions for discussion. This committee consisted of B. A. Hegeman, Jr., chairman, Charles R. Ellicott and D. B. Dean.

The committee then presented its resolutions, which were as follows:

Agreeable to the action taken by the executive committee of the American Electric Railway Manufacturers' Association at its meeting held on October 6, 1919, we beg to submit herewith the resolutions which we were instructed to draw relative to the action which the executive committee of our association

would take provided a certain plan was adopted by the American Electric Railway Association:

President Pardee, of the American Electric Railway Association, in conference with President Finigan, of the American Electric Railway Manufacturers' Association, and James H. McGraw, president the McGraw-Hill Company; S. M. Curwen, president the J. G. Brill Company; J. G. Barry, manager railway department, General Electric Company, and W. S. Rugg, Westinghouse Electric & Manufacturing Company, brought out the fact that it was thought inadvisable at this time to form an affiliated association of manufacturers as outlined in a proposed constitution and by-laws for a suggested association of manufacturers, which proposed constitution and by-laws had been printed and mailed to all of the manufacturer member companies of the American Electric Railway Association, President Pardee giving as the reason for such thought that an association such as proposed was deemed to be unnecessary, and,

Whereas, President Pardee had proposed a plan whereby a nominating committee which would consist of four representatives of railway member companies and three representatives of manufacturer member companies, who would be empowered to select a regular ticket to consist of five representatives of manufacturer member companies, so elected, who would become members of the executive committee of the American Electric Railway Association, every company member, both railway and manufacturer, to cast one vote each for the ticket so nominated, and, such five representatives of manufacturer member companies to have full power on the executive committee of the American Association, be it

Resolved, That it is the sense of the executive committee of the American Electric Railway Manufacturers' Association that that committee take favorable action on the proposition of the president of the American Electric Railway Association to give the manufacturer members of that association representation of five members on its executive committee with equal power with railway members as outlined above, and be it further

Resolved, That the executive committee of the American Electric Railway Manufacturers' Association recommended to its members that the association dissolve, provided that the plan of the executive committee of the American Electric Railway Association as hereinbefore described is ratified by the American Electric Railway Association at large, and be it further

Resolved, That the funds in the treasury of the American Electric Railway Manufacturers' Association be turned over to the American Electric Railway Association for the use of the Committee of One Hundred, after all expenses incident to the winding up of the affairs of the American Railway Manufacturers' Association have been liquidated.

A motion was made by James H. McGraw that the above resolution be approved and this was seconded by M. B. Lambert. It was passed unanimously. The secretary of the association, Fred C. J. Dell, read a statement of the finances of the association which showed that slightly more than $1,000 still remains in the treasury which is subject to a small expense for items incident to settling up the affairs of the association.

After the passing of the motion tentatively terminating the Manufacturers' Association an informal discussion was participated in by a number of those present. All agreed that the solution of the difficult problem which had confronted both the Manufacturers' and American Associations for many years which was proposed by Mr. Pardee was a happy one. Those who voiced the sentiment of the other members to this effect were Mr. Hegeman, Mr. Lambert, S. M. Curwen, C. C. Peirce, C. R. Ellicott and James H. McGraw.

When the meeting broke up it did so with the members in a happy frame of mind due to the fact that they saw wonderful prospects for the future work of the association with the railway and manufacturer members really united to this end.

Some details of future plans were touched also upon.

Purchasing Agents and Storekeepers to Organize

Resolution to Form Standing Committee or Section of the Engineering Association Adopted in Conferences Held at Atlantic City

THE purchasing agents and storekeepers met on Wednesday afternoon at 2 o'clock, presided over by E. E. Stigall, purchasing agent Kansas City Railways. The matter of a permanent organization to affiliate with the parent association was discussed at length. The chairman appointed a committee consisting of H. C. Young, H. J. Vance and William H. Staub to prepare an appropriate resolution. They presented the following:

"It is the sense of those present that a purchasing agents' and storekeepers' association should be formed as a part of the American Electric Railway Association because it is realized that such an organization will be of great benefit to the individual companies on account of the multiplying problems arising in this branch of the service."

This resolution was voted on and carried at a short meeting held on Thursday and it was decided that the purchasing agents' and storekeepers' association should be attached to the Engineering Association of the A. E. R. A.

A committee will attempt to reach all purchasing agents and storekeepers in the electric railway industry to urge attendance at conventions and to make the new purchasing agents' and storekeepers' organization a success. It is well known among purchasing agents that three or four years ago the electric railway man usually looked at two sets of figures, his gross revenue and his net revenue, without being much concerned with the figures in between. But now that the figures representing net revenue have disappeared, he is watching the cost of operation. This has consequently added to the importance of the work of the purchasing and stores departments. The need for a national organization therefore seems more pressing.

A paper on "Modern Problems Before the Purchasing Agent," by William Whiteford, purchasing agent Twin City Rapid Transit Company, was received too late to be read but appears in abstract elsewhere in this issue.

On Wednesday H. H. Adams, Chicago Surface Lines, made a short address at the suggestion of F. R. Phillips, president of the Engineering Association, who advised the meeting that the Engineering Association would extend its full co-operation in connection with the movement the purchasing agents were promulgating.

E. A. Barnitz on Wednesday presented a paper on the "Organization for Purchasing and Stores for Purchasing Agents and Executive Officers," which was published in the *Railway Age* for Sept. 26, 1919. P. F. McCall then delivered an address on the general store system for the proper housing of materials, etc.

The following were in attendance: A. E. Venner, Fonda, Johnstown & Gloversville Railroad; H. H. Adams, Chicago Surface Lines; W. H. Smaw, Georgia Railway & Power Company; P. F. McCall, Metropolitan West Side Elevated

Railway; H. J. Vance, Illinois Traction Company; William H. Staub, United Railways & Electric Company; E. A. Barnitz, York Railways; J. Fleming, Capital Traction Company; H. C. Young, International Railway; B. J. Yungbluth, Pittsburgh Railways; John F. McCabe, Springfield Street Railway; C. W. Mullaney, Albany Southern Railroad; W. S. Stackpole, Public Service Railway, and W. G. Thomas, Southern Public Utilities Company.

Problems of the Purchasing Agents*

Producer and User Must Assist Each Other in Bringing Prices Down by Eliminating All Unnecessary Elements of Cost

BY WILLIAM WHITEFORD
Purchasing Agent Twin City Rapid Transit Company, Minneapolis, Minn.

THE conditions now confronting each individual who purchases supplies must be met with modern methods if the purchaser is to conduct his business profitably for himself or his employer. It is not my intention to enumerate the problems or their solutions, but merely to suggest a few points that may be of interest. Among the items for consideration are these: The rapidly changing market conditions; combinations of sellers or associations to maintain the prices at high levels regardless of actual costs; excessive selling costs, which must include advertising; the tendency of buyers to throw up their hands and pay excessive prices, with the explanation that it is inevitable.

A purchasing agent can be more useful to his company by watching the market than he can by dickering for an extra per cent off the list. Not that discounts are not important—they should be carefully watched—but list prices should also be watched, as they tend to change without notice, sometimes at the expense of the buyer entitled to a big discount.

Careful examination of trade papers showing market conditions and quotations, constant study of prices, and persistent inquiry from individuals in each line in which the purchasing agent may be interested, will indicate when a price warrants a purchase.

The so-called association price, a unit established arbitrarily by a combinaton of manufacturers or sellers covering certain commodities, has become a very important factor in purchasing. Since the war it has entered nearly every line of business, and there is scarcely an item that is not price-governed by some combination or association. If a buyer cannot locate a manufacturer or jobber who is willing to sell his supplies for a legitimate profit, he must surrender to the association and be automatically reduced in rank from purchasing agent to order clerk. If the association is a local one and strong, it can best be handled by passing the business to one house entirely. This will reduce the purchasing expense and, sooner or later, compel the other houses to forget a customer or forget the association.

The cost of goods today is determined by the three items, raw materials, labor and overhead, the last-named including selling and advertising. If the first two cannot be governed, the third surely can.

Overhead is the bugaboo of the manufacturer and the problem to him is how he can get rid of part of it. I have one example in mind where the overhead of an implement manufacturing company is five times the cost of raw material and labor on a finished unit. It was divided as follows: Shop superintendence, etc., cost an amount equal to the cost of labor and material. Selling expense and advertising each cost twice as much as labor and material. It is therefore possible to have reduced prices without injuring the worker or the producer of raw material, in some lines at least.

Consumption of materials cannot keep pace with production unless costs are lowered, and unless producers adopt different methods of disposing of their wares.

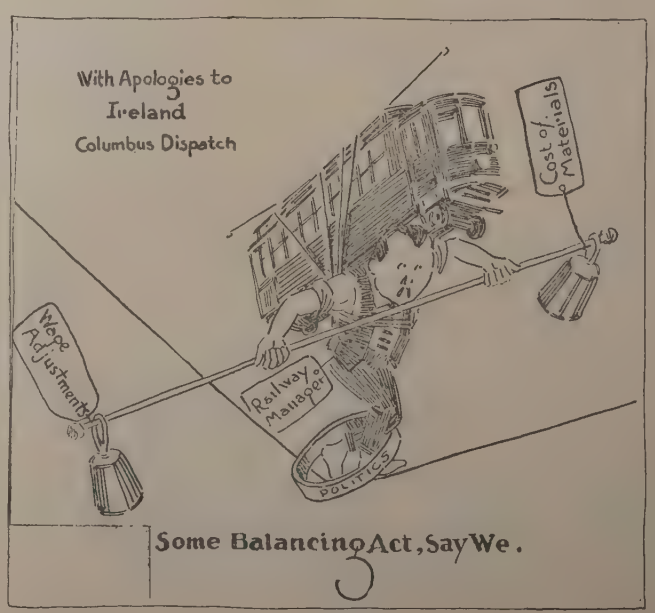
The war has brought out new manufacturers and new producers of raw materials, but the ultimate consumer remains the same, and uses the same quantities of supplies. In the case of most traction companies, less material than usual is now being used, of necessity rather than desire. Sooner or later over-production will lower prices, but this will not give the relief necessary at present. If the manufacturers will discontinue the expensive sales propaganda now being used all over the country, and turn their disbursers into producers, costs will rapidly lower themselves without injury to anyone.

When the purchasing agent reviews his day's work it is quite possible that he may recall that, say, six representatives from business houses have called upon him for conference regarding the same commodity. If the price is governed by an association and the goods have equal merit, quite evidently a great deal of time has been wasted by buyer and seller.

Again a great deal of expensive advertising matter is being sent through the mail. In most cases this is very elaborate and causes a conscientious purchasing agent to shudder when he compares it with the stationery he buys for his own company. Obviously the customer pays for this luxury in the price he pays for his goods.

I believe that the seller would prefer to stop excessive selling costs, and if he really wishes to do what is best for his customers and realizes how they feel, he will discontinue the present practice.

If the purchasing agent will decline to be a party to the excessive costs of today and work with the manufacturer, he will benefit both the producer and the consumer. Certainly the producer realizes that high costs do not assist sales, but rather hinder them. If sales do not come regularly his business begins to decline. High prices surely do not help the consumer. There is then but one thing to do, buyer and seller must co-operate to bring down costs for the benefit of each other.



* Abstract of paper presented by title at meeting of Purchasing Agents at Atlantic City, N. J., Oct. 7, 1919.

Publicity Men Meet to Organize

A Committee Attached to the American Association Favored as the Best Form of Organization—Officers Chosen Tentatively and the Plan Placed before the Executive Committee of American Association

ABOUT twenty-five publicity men gathered in an informal meeting in Publicity Men's Hall on Tuesday afternoon for the object of discussing ways and means for creating a permanent organization of the electric railway publicity representatives. Leake Carraway, Virginia Railway & Power Company, acted as temporary chairman and was chosen as permanent chairman to act during the preliminary discussions.

After Mr. Carraway had informed the meeting of the status of the work done to date toward effecting an organization of publicity men, he called upon D. W. Burroughs, United Railways & Electric Company of Baltimore, who presented a paper on the value and necessity of publicity, an abstract of which appears elsewhere.

Secretary Burritt then addressed the meeting, stating that he had been authorized by President Pardee to say that the American Association stood ready to give material support to any concrete plan which the publicity men were agreed upon as being a workable arrangement for amplifying and intensifying the publicity work in the industry. He also expressed the opinion that the interests of the publicity men would be served to much greater advantage if they were organized as a committee of the American Association than they would were they to organize as a separate affiliated association. The direct connection with the executive association would serve to bring the publicity men in very close contact with the railway executives, with whom the publicity work is so intimately connected.

B. J. Mullaney, director, Public Utilities Publicity Bureau, Chicago, then addressed the meeting, calling attention to the organization of a publicity section which had been effected in the national gas association. He considered that the function of such an organization was to gather and disseminate publicity matter, serving as a clearing house for the best publicity ideas developed in the industry. He thought that such a bureau could also be of great service to the smaller companies, which are not able to hire a publicity man, as the work of the bureau would serve to teach the managers who usually handle this work how best to use publicity and what character of matter to bring to the attention of the public.

Mr. Mullaney then outlined the work which had been done by his publicity bureau in Illinois for the telephone, electric light and electric railway interests. He said that the bureau had been putting out matter for the newspapers in an effort to give the public a better understanding of the fundamentals of the utility business. In this publicity matter, it had been endeavored to keep away from politics and make it informative rather than argumentative in character. He said there were 900 papers in Illinois, of which the bureau had subscribed to something less than 300 as a means of checking up on what results were secured. In the period from April to September of this year, these 300 papers had printed more than 7000 in., or more than 400 newspaper columns, of the matter prepared by the bureau. He said the most gratifying part of it was that the papers were using this matter in increasing amounts. He also gave some evidence of the results which had been obtained in bringing the public into a better frame of mind toward the utilities. He said further that even if the papers did not print any of the matter which was being put out, if the bureau succeeded only in getting the editors to read what was sent to them, something would be accomplished and would be reflected in editorials. He declared that the value of utility publicity was not in any single piece of fine copy, or in any one smashing editorial, but that it was derived from a constant supply of information to the public, coming along in such a natural manner that the reader does not know that his mind is being formulated at all.

Harlow C. Clark, editor of *Aera,* then addressed the meeting briefly. He said that as long as the public thinks that the corporations are working to put money into their own pockets, it will be impossible to do away with public antagonism. He thought that one of the problems for the publicity men was to teach the public that the corporation was working in the interest of the community primarily. He pointed out that a national organization of publicity men could serve to supply the individuals with the national side of the electric railway problems, which the publicity men could then formulate into matter suitable for local consumption.

The meeting was then turned into a round-table discussion and each man was called upon to rise, state his name and official position and express what ideas he had on the manner in which the publicity men should organize. While a few expressed a preference for a separate affiliated association, which they felt was warranted by the importance of the work, the consensus of opinion seemed to favor a committee or bureau directly attached to the American Association. This discussion finally culminated in the appointment of a committee of five to formulate a definite plan of organization and activities, based on the discussion heard, and report at the meeting to be held the following day. The men appointed to this committee were Leake Carraway, E. R. Kelsey, Luke Grant, W. P. Strandborg, and A. D. B. Van Zandt.

Near the close of the meeting President Pardee paid a brief visit to the meeting and made a few remarks. He called attention to the great mass of testimony which has been presented before the Federal Electric Railways Commission as being a source of a large amount of publicity material. He said this would be made available to the members since the association planned to have the record printed. The president also referred to one of the recommendations made in his presidential address in which he advocated the organization of forums in each community, where the street railway problems might be thoroughly discussed. He said that this was a thought which the publicity men might well foster. He also said that he would be very glad to receive from the publicity men a plan for securing a large amount of publicity on the coming report of the Federal Commission, believing that the full and free presentation of all sides of the traction situation before this commission would result in expressions by the commission which would have great weight with the public.

Wednesday's Meeting

The publicity men reconvened on Wednesday afternoon for the purpose of taking up the definite recommendations of the committee which had been appointed the day before to draw up a plan of organization. The committee had decided to prepare the skeleton of an organization plan for presentation to the executive committee of the Ameri-

can Association, leaving the details to be worked out by the executive board of the publicity committee.

The plan of organization which the committee had agreed upon was that of a standing committee of the American Association, which would have a chairman and vice-chairman and an executive committee composed of five members elected from the committee-at-large and the two officers.

Chairman Leake Carraway then appointed a nominating committee composed of E. R. Kelsey, W. P. Strandborg and W. T. Waters to bring in nominations for the officers and members of the executive committee. This committee retired for a few moments for consultation and then recommended to the convention that it make Leake Carraway chairman and Luke Grant vice-chairman, and that the chairman select the members of the executive committee subject to the approval of the convention.

The chairman appointed and the convention approved the following members of the executive board in addition to the two officers: A. D. B. Van Zandt, John W. Colton, W. D. Burroughs, E. R. Kelsey and W. P. Strandborg. Secretary Burritt came into the meeting at this point and after some discussion with the delegates, it was decided that the exact plan of organization should be redrafted before presentation to the executive committee of the American Association at its meeting Thursday afternoon. A meeting of the executive board of the publicity committee was set for 10 o'clock on Thursday morning in the ELECTRIC RAILWAY JOURNAL booth for the purpose of drawing up the plan for presentation to the parent association executive committee.

Secretary Burritt asked the publicity men to give their careful thought and energetic attention to the formation of local forums as suggested by President Pardee and to the organization of a company section in their company if one did not already exist.

Before adjourning the publicity men adopted the following resolution for presentation to the American Association at its session the following morning:

"Your publicity men in convention assembled hereby express their appreciation of the support and assistance given them by the officers of the American Electric Railway Association, and hereby tender their services in any capacity in which they may be helpful in furthering the work of the association."

At its meeting on Thursday morning the executive board drew up a letter for presentation to the executive committee of the American Association, containing certain recommendations. The letter follows in part:

"That a regular standing committee on publicity, composed of the two officers and five other members of our committee, which now constitute our executive board, be created and appointed by the American Association, as the body through which we may work with the executive committee of the parent association.

"After much careful consideration, we have decided upon a plan for the exchange of ideas and experiences of publicity men through the office of the association. A detail of this plan calls for regular and full reports to this office of all the doings of the publicity men of the industry. We recommend the assignment of a man in the secretary's office to the handling of our work, the preparation of a news letter to all member companies, regardless of whether or not they are using publicity systematically, and the summarizing of the successful and unsuccessful experiences of all member companies on matters of general interest.

"We have, by resolution, put ourselves at the disposal of the American Association for any general service which may be required. This means that through the regular standing committee we recommend, the parent association may promptly and effectually put into operation throughout the entire industry any plan which may from time to time be developed for reaching the general public.

"It is our plan to meet in the middle of the year, and at a round table discuss the problems which have arisen in our work, and to keep in immediate touch with each other through the committee and through the New York headquarters of the association.

"It should be borne in mind that except when so directed our 'committee of the whole' will not touch policies of the association, but will deal with each other in the exchange of ideas and experiences for our mutual benefit.

"We believe that in the ways suggested we can be of service to the industry as a whole, and that is our prime object.

"Should you desire our presence, the members of our executive committee, which we recommend shall become your regular standing committee, are ready at any and all times to meet with you."

The American Association executive committee received the communication at its meeting on Thursday afternoon and decided to refer it to its successor.

The Value and Necessity of Publicity*

Ways Are Suggested of Gaining Public Confidence—Employees Are an Excellent Medium for Circulating Effective Publicity—Permanent Organization Suggested

BY W. DWIGHT BURROUGHS
Publicity Manager United Railways & Electric Company, Baltimore, Md.

PERHAPS there was a time when the value or necessity of publicity for a street railway was questioned, but that time has passed. We are now breathing an atmosphere which inspires the belief that publicity is valuable and necessary for about everything on the face of the earth except moonshine distilleries.

Probably there are some individuals who still hem and haw a bit about this or that feature of publicity, and there are probably some who still object more or less to specific publicity on the ground of "policy." There are occasions, it is quite true, when a great deal of care must be observed that facts and figures are not misinterpreted or misapplied, but much more often the fear of publication is unjustified, and the very best results may be secured and the most satisfactory returns insured by laying all the cards on the table.

Some genius has prefaced his presentation of railway publicity with the admirable admonition "Learn the Truth," and the best practice that can be observed by our companies is to teach the public truths about the business in the communities which we service.

Never has street railway publicity thrived so wonderfully as since high prices of labor and materials forced hundreds of companies to make application to regulatory bodies for the right to increase fares. To prove their point they have had to bare the innermost secrets of their hearts. We have seen presented to utilities commissions, and to city, state, and federal boards the most intimate minutiæ of every detail of railway organization and practice, with volumes of figures and facts concerning operating and financial phases of the business, much of which material had been guarded before, in many instances, as jealously as the favorite wife in the Sultan's harem.

The newspapers have printed more, and the people, through the newspapers and our own publicity campaigns, have learned more about schedules, and time cards, and salaries and wages, and costs, and bond issues, and stock values, and per mile expense, and per passenger revenue, and peradventure receiverships, than they ever knew or dreamed of before.

* Abstract of paper read at meeting of publicity agents, American Electric Railway Association, Atlantic City, N. J., Oct. 7, 1919.

In the recent car fare hearing in my own city absolutely nothing was held back. The company presented such a complete record of its business and its methods to the public through the utilities commission that there is not an individual in the community who can say he has not had an opportunity to learn the whole truth. With this open presentation of every detail of Baltimore's street railway business I do not know of a single instance in which any of this information thus fearlessly laid bare caused one iota of injury to the United Railways.

Therefore, fare hearings have not been without their blessings, for, even if we did not in every case achieve relief to the full extent that our conditions demanded, there was undeniably created in the public mind a clearer understanding of the real seriousness of our situation, and a more wholesome regard for the spirit of fairness and frankness with which we endeavor to conduct the business.

In the meantime, however, there has been constant increase in the number of companies which have come to recognize the value and necessity of publicity methods and have added to their staffs men trained in this work.

This growing appreciation by railway managements of the value of public limelight is due to two things:

First: a realization that the people are entitled to *know*.

Second: that it is not going to hurt, but is going to aid the company, *to help the people to know*.

There is nothing to fear from information that we give the public. Our great danger lies in the misinformation that some persons are all too eager to circulate. The antidote for this is to fill the minds of the public with the truth backed by honest practice and service.

It is so very easy to understand that the best interests of a street railway is to properly serve the people, that there can be but one answer to the question: why does any part of the public assume, that the company is antagonistic to the people, arbitrarily set against them, contrary-minded and obdurate? And that answer is, the people do not know. They have not been taught to think kindly of corporations generally, and they have had many opportunities to be misinformed concerning street railways in particular.

No public service corporation will ever be free from unjust attacks. There is no earthly possibility of the extinction of the fanatics, grouches and unreasoning people who constitute an ever-present thorn in the side of everything good. But the vast majority of the people are reasonable, if one can reach them and direct their reasoning into correctly charted channels, and this directing must be done by service and publicity.

Once we gain public confidence, we have the greatest lever on earth for successful business. Then we must be fair and square in our publicity or we will damage the cause, just as any business man who fools or trifles with the public, loses its confidence, esteem and support.

One of the best forms of publicity for an electric railway is that done by individual employees and they must be taken into account in our publicity plans. The newspapers may devote columns of space to articles saying that the street railway company treats its men with fairness, but the man who reads those columns will not be half so much impressed as he will be by the answer of an employee in such a conversation as this:

"Where are you working?"

"On the cars."

"How do they treat you?"

"Fine!"

Here is the ideal situation. The company has won the loyalty and confidence of the employee, and he has become a preacher to the people. Railways need thousands of such preachers, and frequently they will be far more eloquent than a whole lot of words in the newspapers.

To the extent that a company is able to instill in the heart and daily practice of each individual employee a spirit of care, courtesy, capability and co-operation, to that extent will it progress toward the solution of its problems. If a railway is diligent, constant and conscientious in its devotion to service, it is going a long way in helping publicity to infuse some of this spirit into the public mind.

In accomplishing these results we find that the interests of the publicity department extend to every phase of the employees' lives, from receiving fair wages and having proper working conditions to the enjoyment of baseball and annual excursions. And I might add that it has been our practice for some time to send a baby rattle to the home of every employee in which there is a little newcomer.

The inestimable value of personal contact should not be overlooked, the representatives of publicity departments should maintain cordial and frank relations with their town newspapers, newspaper men, newspaper men's club, advertising men's club and other civic bodies and representative men.

At the 1916 convention it was suggested that the association should establish a sort of clearing house for street railway publicity which would make suggestions and prepare special articles and general matter that would be available for use by all member companies. This excellent idea is, I believe, the inspiration of our gathering here today. There was also the suggestion that company publications, both those for the public and those for employees, should be standardized. This plan has its virtues and drawbacks, and the obstacles may be found to be particularly difficult to overcome in the case of employees' magazines. They would be difficult, too, with good-will pamphlets when local conditions in a community demanded special rather than general attention.

The publicity clearing house should perform two functions. One of these is to provide a flow of general matter—not voluminous, but pointed—that would be adaptable to general use. The other is to afford a supply of data concerning present practice that may be drawn upon by those interested.

Far too often it has been the case that railway companies have not seen the necessity nor appreciated the value of publicity until the sky darkened, clouds lowered, thunder rolled, and sometimes lightning actually hit them. A national organization of publicity men would tend to emphasize, in the minds of all executives, the great importance of a sound publicity program.

Back in our native town, wherever that may be, we can all recall a dear old lady who would call over the fence to her neighbor:

"'Tain't going to rain today; John took his umbrella."

And John himself was almost convinced that, no matter how threatening the weather, if he carried his umbrella he was certainly not going to have any occasion to use it.

We really don't believe this had anything at all to do with the weather, for some times it did rain, and the umbrella was then really appreciated. Publicity umbrellas will not always keep the weather clear, and they will not always keep us from being drenched when the floods descend, but it is mighty soothing and consoling to have them around and in good working order under fair skies as well as when the storms break.

If there is any street railway in the land that has not been caught in a storm of trials and tribulations in the last two or three years we have failed to see its picture in the very thorough magazines of Brother Blake, or Brother Clark, or Brother Van Auken.

Publicity, coupled with conscientious service to the extent that a company's resources will permit, is necessary and valuable at all times, and any plan that may be developed at this convention for more extensive, more efficient, and more result-getting publicity will certainly redound immeasurably to the good of the electric railway business.

Entertainment Features of the Convention

This year, as in previous conventions, all of the entertainments were held in the ballroom at the front end of the Pier. This hall was tastefully decorated with flags, bunting and green plants. Music for the daily morning and afternoon concerts as well as for dancing in the evenings was furnished by Strickland's orchestra, which was located in a latticed booth just opposite the entrance.

On Monday evening there was the annual reception to the officers of the American and affiliated associations and their wives; after which general dancing was enjoyed. Eight hundred persons attended. The arrangements were in charge of E. F. Wickwire.

On Tuesday afternoon a ladies' bridge tournament was held in the ballroom, in charge of H. N. Ransom who has had charge of such entertainments for many years. Prizes of eight-ounce bottles of Houbigant's Parfum were won by the ladies of Table 6, namely Mrs. W. F. Weh, Mrs. P. E. Wilson, Mrs. W. P. Hurst and Mrs. Ralph Stickle, all of Cleveland.

On Tuesday evening 1200 people enjoyed informal dancing. Special dance features were given by the Gills, Mlle. Marguerite and her brother Frank, continental dancers. Credit for the entertainment is due W. G. Kaylor.

Wednesday evening was "carnival night" and, as usual this entertainment drew the largest attendance. William V. Dee, in charge of arrangements, provided paper hats, balloons and serpentines for all guests. Special features were furnished by a group of eight girls from the Vestoff-Serova Russian School of Dancing.

An exhibition waltz also was given by S. S. Crane and Mrs. Crane of Altoona, who were the winners in the prize dance given at the 1916 convention.

A word must be said in closing of the Curtiss seaplane flights taken by the ladies. On Tuesday morning Mrs. J. H. Pardee, Mrs. F. R. Phillips, Mrs. R. E. McDougall and Mrs. J. P. Barnes made the first flight. They circled the Boardwalk and the Convention Pier, following for a time the NC-4 on its way to Philadelphia.

On Thursday afternoon through the courtesy of President Pardee the six ladies in charge of the convention registration also made flights. These were the Misses Leonard, McGath, Arnesen, Clark and Kelley, and Mrs. Siebreck, all of the association's New York office.

Biographical Notes Regarding the New Presidents

JOHN H. PARDEE, re-elected president of the American Association, is president of the J. G. White Management Corporation. He was formerly a lawyer, having been admitted to the New York bar in 1891, two years after graduation from Hamilton College. His entry into the utility field was made in the capacity of general manager of the Ontario Light & Traction Company, and the Canandaigua (N. Y.) Gas Light Company.

In 1902 Mr. Pardee was appointed general manager of the Rochester & Eastern Rapid Railway, and at this time discontinued the practice of law to give his entire time to utility management. In 1907 he joined the organization of J. G. White Company, Inc., as operating manager of the public utility properties managed by that company. When in 1913 the White Company organization was rearranged to segregate its different interests into three groups he became president of the appropriate company in the group.

W. H. COLLINS, president of the Transportation & Traffic Association, is general manager of the Fonda, Johnstown & Gloversville Railroad, Gloversville, N. Y. He rose to this position from the mechanical department of the same company, through the general superintendency in which he succeeded J. N. Shannahan in 1907.

Mr. Collins entered railway service in the steam field. In 1881 he became timekeeper on the extension of the D., L. & W. Railroad between Binghamton and Buffalo, N. Y. From 1883 to 1888 he was successively in the employ of the Geneva, Ithaca & Sayre; the Elmira, Cortland & Northern; the Southern Central, and the West Shore Railroads, as agent and operator. On Jan. 1, 1888, he entered the motive power department of the West Shore Railroad, later becoming assistant to a division master mechanic. On Jan. 1, 1898, he entered the employ of the F., G. & G., and five years later was appointed master mechanic.

ERNEST ROWLAND HILL, president of the Engineering Association, is a member of the firm of Gibbs & Hill, consulting engineers, New York City.

Mr. Hill received his preparatory educational training at the Pratt Institute in Brooklyn, N. Y., following this with a course in mechanical and electrical engineering at Cornell University. He graduated in this course in 1893, at the age of twenty-one and immediately thereafter spent two years in a shop course at the Westinghouse Works. The six years following were spent with the Westinghouse Electric & Manufacturing Company as special engineer.

In 1901 Mr. Hill went to England as chief engineer of the British Westinghouse Company, with headquarters at London. He returned to the United States in 1906 to become associated with George Gibbs assistant chief engineer of electric traction and station construction for the Pennsylvania Railroad and was actively connected with the electrification of the New York terminal. In 1912 he became a member of the firm of Gibbs & Hill.

SAMUEL B. HARE, president of the Claims Association, is a native of Altoona, Pa. After preliminary education in the schools of that city he attended Susquehanna University and has the honor of having been the first valedictarian of that young institution, from which he graduated as A. B. in 1896. After reading law in a local office in Altoona he entered the law course of Dickinson College and graduated in 1898. After continuing the reading of law during the summer, he returned to Dickinson for a post-graduate course, receiving the LL. B. degree in 1899.

Mr. Hare was admitted to the Pennsylvania State bar in 1899, and has since been in active practice of his profession. In 1903 he was admitted to practice in the Supreme Court and in 1905 was admitted as a member of this court. He is a member of the State Bar and American Bar Associations. In 1904 he was appointed claim agent for the Altoona & Logan Valley Electric Railway, a subsidiary of the American Railways, and assistant to its chief counsel.

I. A. MAY, president of the Accountants' Association, is comptroller of the Connecticut Company, which controls and operates electric railway lines in central and western Connecticut, reaching over into adjoining states.

Mr. May has had a varied and interesting accounting experience. He entered the electric railway business in 1902 with the building of the Berkshire Street railway in Massachusetts, as clerk and paymaster. In 1904 he joined the staff of the Consolidated Railway in New Haven, and handled the railway, electric light, gas and water accounts as head bookkeeper and chief clerk to the auditor. When the Connecticut Company was formed in February, 1910, the Consolidated was absorbed, and he continued with the new company. He was appointed auditor in July, 1911, became comptroller in January, 1913.

Mr. May passed the certified public accountancy examination in June, 1915. He is author of a standard work on accounts in the electric railway field, namely, "Street Railway Accounting." He is also vice-president of the Connecticut Society of Certified Public Accountants, and is vice-president for Connecticut of the New England Street Railway Club.

FEDERAL ELECTRIC RAILWAYS COMMISSION

From left to right, W. D. Mahon, C. W. Beall, Philip H. Gadsden, Charles E. Elmquist (chairman), Charlton Ogburn (standing), Edwin F. Sweet, Dr. Royal Meeker, Louis B. Wehle

Federal Commission Holds Final Hearings

The Federal Electric Railways Commission Held Hearings All Last Week at Washington—The Views of Labor Leaders and of Railway Operators and Consulting Engineers Were Presented

WITH Commissioners Elmquist, Sweet, Meeker, Gadsden, Wehle and Mahon and about fifteen others present, the Federal Electric Railways Commission resumed hearings in Washington on the morning of Sept. 29. As Chairman Elmquist called the meeting to order, he gave warning that the usual modest working hours of from 10 a. m. to 10 p. m. would be adhered to during this final week.

The first witness to be heard was C. J. Joyce, who appeared in behalf of T. E. Mitten, president Philadelphia Rapid Transit Company. Mr. Joyce began his testimony by reading a statement prepared by Mr. Mitten, which appears elsewhere in this issue.

Mr. Joyce then gave a great deal of matter which was intended as evidence of the success and the value of the employees' co-operative plan as a means of bringing about increased revenue with decreased operating expense. The theme of the testimony was the confidence which had been evoked between the men and the company and also between the public and the company. This continued confidence and support was considered by Mr. Mitten to be one of the most essential conditions to successful street railway operation. Mr. Joyce said that it was Mr. Mitten's aim to instill into the public mind the conviction that the street railways are their property in the true sense of the word, since they are supported solely by the people, and that, therefore, whatever burden is placed upon the street railway by the municipality or by any group of citizens is a burden placed upon the whole people of the city. In any appeal to a municipality for relief from burdensome fees or for permission to make any change in service as a means of effecting economies, the efforts of the company are likely to fail unless they have that public support which follows the feeling on the part of the public that the interests of the traction company in such matters are identical with the interests of the car riders.

LABOR TURNOVER

As a means of indicating the success of the co-operative plan in gaining the confidence of the trainmen and of retaining them on the payroll as satisfied employees, Mr. Joyce presented the following data covering dismissals and resignations, etc., of trainmen:

	Appointments	Resignations	Discharges	Aver. No. of employees	Per cent turnover
1911	2,453	1,106	1,131	6,980	35.14
1912	1,256	988	566	6,980	18.18
1913	794	547	365	6,552	12.
1914	239	232	203	6,169	3.
1915	83	177	110	5,929	0.1
1916	1,339	509	564	5,962	22.
1917	1,994	1,574	285	6,131	32.
1918	4,817	3,551	1,014	6,114	78.
1919 (8 mo.)	1,139	774	450	6,143	18.

It will be noted that an exceedingly low number of men were hired in 1915. This is accounted for by the fact that the company inaugurated extensive rerouting of cars which materially decreased the number of trainmen required. While no men were discharged, fewer appointments than usual were made so that the over-manning of the cars was taken up in this manner. The large increase in the percentage of turnover in 1916, 1917, and particularly in 1918, was due to the war conditions, the full effect of the draft and the movement of men to more highly-paid employment being felt in 1918. The figures given for the eight months of 1919 indicate that conditions are again returning to normal.

During the course of his testimony Mr. Joyce presented at some length the various features of the employees' co-operative plan and the results which have been obtained from it. These have been presented from time to time in the ELECTRIC RAILWAY JOURNAL.

Operating Economies

Aside from the advantages gained through the good relations which have existed between company, men and public, much of the success of the Philadelphia company was attributed to economies in operation which have been accomplished through the adoption of better equipment, the skip-stop system, energy-saving campaigns, and various other engineering and traffic improvements. In this connection, the work of the time-table department in conducting careful traffic checks as a means of closely adapting the service to the needs of the public and of revising the service as frequently as traffic conditions changed were referred to as contributing much to the reduction in operating costs and in keeping the public satisfied with the service rendered. A paper on the methods of making these traffic studies which was presented before a recent meeting of the Pennsylvania Street Railway Association and published in the ELECTRIC RAILWAY JOURNAL for July 12, 1919, page 75, was also entered in the record.

By increasing the average speed in miles per hour for the system from 8.08 in 1910 to 9.06 in 1918, it has been possible to increase the passenger receipts per car-hour from $2.19 in 1910 to $3.48 in 1918. Likewise, the passenger receipts per car-mile have increased from 27.2 cents in 1910 to 38.4 cents in 1918. This increase in speed was accomplished through improvement in various factors; as for example, the reduction in the number of stops and the cutting down of the time consumed at each stop through the introduction of the near-side and center-exit doors and the equipping of all of the company's cars with door-operating devices.

The application of the skip-stop plan had resulted, Mr. Joyce testified, in reducing the number of stops in the city by more than 1700 out of a total of something less than 6000. While it was difficult, he said, to estimate the total saving resulting from this plan, it was definitely known that a saving of $100,000 in payroll had been realized due to the conservation of the time of the operating crews, and a saving of $300,000 per annum in electrical energy. By comparison of the per car-mile cost of operation for a calendar month before the skip stop was installed, with the same cost for a like period after the installation, the company's engineers estimated a saving of 1.07 cents per car-mile or a total saving of $1,318,000 per annum. They further estimated an ultimate saving of approximately $100,000 per annum additional, as the result of releasing equipment from service.

Accident Prevention

The witness then presented as evidence the information that for the eight years ending in 1910, 6.08 per cent of the gross earnings of the company had been spent for accident claims and that in addition there was an unpaid liability of an amount not estimated involved in a total of 4953 unsettled suits on Dec. 31, 1910. With the introduction of modern equipment, which included every known safety device for the cars, a crusade was undertaken among the school children under the direction of a capable young woman who soon became known throughout the city as "Miss Safety First." Through cheerful co-operation of the school authorities the campaign of educating the children against danger bore fruit by reducing the accident cost during the eight-year period since 1910 to 3.47 per cent of the gross earnings, and with the number of pending suits decreased to 2524 on Dec. 31, 1918. This reduction in accident cost represents a saving of $5,292,054, and it was made in contrast to the condition pictured by the police reports for 1918, which showed an increase of 1980 street accidents over the year 1911, while the traction company showed a decrease of 752 in car accidents for the same period. In 1911 there was one accident to 18,640 passengers carried while in 1918 the ratio was one accident to 41,622 passengers carried.

Fire Insurance

In 1910 the Philadelphia company carried $18,500,000 of fire insurance at a premium of 50 cents per $100. By the provision of adequate and effective inspection this has been reduced to 25 cents per $100 per annum, and besides there have resulted many collateral benefits due to the regular careful inspection of the property. From 1911 to 1918 over $600,000 was paid in premiums to insurance companies and the company received in return less than $60,000 for fire losses. On Dec. 31, 1918, therefore, the company assumed 33 per cent of its own risk. A careful survey of the property demonstrated that the greatest possible loss that could be sustained in any one fire would not exceed $250,000. The insurance fund, discontinued in 1910 to aid the company in meeting obligations, has been re-established with assets of more than $1,000,000.

Car and station advertising as a source of legitimate revenue has been developed by the company from producing an annual net income of $160,732 in 1910 to an annual net income of $205,677 in 1918, and Mr. Joyce said that a further increase in 1919 to $300,000 is expected.

Another source of revenue which had been developed by the Mitten-Stotesbury management was the Willow Grove amusement park. This, it was stated, had been originally designed by the former management, was badly located at the extreme end of a long ride and had always resulted in a loss of not less than $50,000 per year on operating costs, without any return on the $1,000,000 investment in it. By revising the rental rate for concessions and bringing to the park many very high-grade musical attractions, the former deficits were turned last year into a profit of $132,000. This year, after $75,000 for music is paid, the company expects to clear $150,000. This, it was claimed, had been done largely by making the most of what the park afforded.

Mr. Joyce presented a review of the operating conditions for the eight years from 1911 to 1919, making frequent reference to the tables published in a pamphlet entitled "The Three-Cent Exchange Case," which was recently heard by the Public Service Commission of Pennsylvania. A summary of one of the tables from this book shows that for the period from Jan. 1, 1911, to June 30, 1919, there had been a total capital outlay of $26,231,411; that the Philadelphia Rapid Transit Company capital stock paid in was $14,540; that the securities isssued by the P. R. T. and underlying companies was $17,066,000; that loans from the United States government to provide additional facilities for war industries, was $3,913,152; that the net income appropriated for capital expenditures was $3,551,246; and that the expenditures from the renewal fund for new cars amounted to $1,686,472.

Operating Reports for Eight Months of 1919

To give the commission an idea of the operating conditions in Philadelphia as nearly up to the minute as possible, the witness introduced the following data, the 1919 figures being estimated on the basis of the actual figures for the first eight months:

	For 1919	For 1918
Operating revenue	$22,964,499	$20,444,555
Operating expenses and taxes	15,833,330	13,402,587
Operating income	7,131,169	7,041,968
Non-operating income	354,089	420,391
Gross income	7,485,258	7,462,359
Fixed charges	6,483,664	6,406,258
Net income	1,001,594	1,056,100

At the afternoon session Monday, Mr. Joyce concluded his direct testimony by outlining the development of the present transportation system in Philadelphia from its beginning in 1831 through the consolidation of some fifty odd companies into the present Philadelphia Rapid Transit Company. In the cross-examination which followed, Chairman Elmquist asked about the workings of the co-operative committees. The witness replied that nearly all questions of difference had been settled in the division or department committees, these being the first two bodies to consider any controversy. Very few questions had been brought before the general committee, and as yet resort to arbitration had not been necessary in the settlement of any dispute. It was explained in connection with this statement that the men still had the right to strike if they chose.

Questioned whether the Philadelphia plan would be applicable to and would bring similarly good results in other cities, the witness was reticent to state an opinion, although he did say that it would not be possible to make as good a showing in Pittsburgh on account of the topographical difficulties and the long hauls necessitated by the peculiar distribution of the population.

In answer to questions concerning the degree of water in the stocks of the subsidiary companies, Mr. Joyce said that these properties had not been valued at the time they were taken over by the P. R. T. Co., but that the public seemed to feel that there was an inflation in the capital of these twenty-two companies for which rentals varying from 8 to 28 per cent are paid. These leases are either for 99 or 999 years, it was pointed out, and there was no prospect of breaking away from them.

Commissioner Sweet sought information as to the jitney competition and the effect of the privately-owned automobile. The witness stated that there was no jitney competition and that there were no statistics available to show the exact effect of the private automobile, but that the riding habit of the population had increased from 1910 to 1919 more rapidly than the increase in population. He believed that this was due to public popularity of the system and the frequency of the service supplied.

As to whether lower fares during off-peak hours would tend to increase the riding during those hours and reduce the rush-hour traffic the witness was of the opinion that the number of people that could be induced to ride was too limited to be an important consideration and also that the people who rode at these hours were of a class to whom a saving of a cent was no particular inducement. Questioned as to the possibility of income from the hauling of freight, Mr. Joyce said that the cost of handling was so great, particularly on subway and rapid transit lines, as compared to the cost of transportation over the short distances involved, that it limited the volume of business that could be attracted, although the company was now deriving a certain amount of revenue from this source.

In his testimony, the witness emphasized the idea that the inference should not be drawn that the measures and practices adopted and followed in Philadelphia would have worked equally favorable results elsewhere. It was also pointed out that the results of the work done in Philadelphia had been available to members of the American Electric Railway Association and that the industry had made use of the ideas as far as they were applicable to the local conditions of each company.

In reply to questions Mr. Joyce said that the company was not contemplating any increase in fares and that it had studied the zone system, but there was no movement to install such a system in Philadelphia. At present the company is centering its attention on the problems of producing greater economies and improving its service to increase the riding habit, and is using dash and inside car advertising as one means of inducing further patronage.

In reply to a question as to the value of the service-at-cost franchise, Mr. Joyce said the primary object of a company should be to gain the good-will of the community, and with this done the kind of franchise would not make much difference.

Secretary Ogburn then read a statement sent to the commission by Thomas L. Sidlo, formerly a law partner of Newton D. Baker in the working out of the transportation problem in Cleveland. An abstract of this statement appears elsewhere in this issue.

On Monday evening Walter Jackson, Brooklyn, N. Y., formerly business manager ELECTRIC RAILWAY JOURNAL and now consulting expert on railway matters, emphasized the possibilities of further operating economies.

Questioned by Commissioner Wehle as to the effect of the zone system on the possible congestion as affecting housing, health and welfare of communities, Mr. Jackson felt that zone fares might temporarily disturb property values and housing conditions. In cities developed along zone-fare principles, as in Glasgow, rents are less for houses on the outskirts than elsewhere. The witness also brought out that character of housing was largely a local condition. In England everyone wanted a single-family house, while in Glasgow the people lived in tenements. In the United States, New York City's apartment habit contrasted with the one-family houses of Philadelphia and Baltimore. In New York, apartment houses actually followed the coming of rapid transit routes. Mr. Wehle asked if this was not because real estate values increased with the building of rapid transit lines so that the land values were so high that the man with only a small capital could not afford to build a house for himself along these lines, but that it was necessary for syndicates to build large apartment houses and rent them to men of small means. Mr. Jackson agreed that this was an important factor.

When questioned regarding zone fares, the witness said that in fairly compact cities routes 2½ or more miles in length should be divided into zones. By so doing it would be possible to obtain two classes of riders, namely, short riders of one zone or a fraction of a zone and riders up to the whole length of the route. However, it was wrong to encourage people to ride long distances on slow street railway lines when in many instances the payment of a few cents higher fare made available a train which would enable the passenger to reach his destination in much less time. Mr. Jackson felt that the surface lines of New York City would be ideal for a zone system of fares if they charged a lower minimum fare than did the subways. The latter would then be used more largely for the long-haul traffic. Each mode of transportation ought to be sold according to its character.

Questioned as to the operation of buses, he said that in England a private owner could enter the bus business without special parliamentary sanction such as is needed by a municipal or other tramway. In London the fares on buses competing with tramways are the same, but the non-competitive bus fares are about 30 per cent higher. As a rule bus fares are cumulative, while the tramways charge only a maximum of 8 cents for a ride of eight stages or more.

In the United States the municipal railways of San Francisco have used buses to develop the Golden Gate Park territory. Buses have also been used to some extent by the Stone & Webster companies in the State of Washington as feeders to the interurban lines.

Asked as to whether buses could fully take the place of street railways, Mr. Jackson felt that they could not because the trolley car still offered the cheapest and most practical way to handle "large crowds." As to profitable operation of buses, the witness stated that prior to the last two years, the London General Omnibus Company had paid modest dividends little above bank interest, while the first quarter of 1919 actually showed a deficit. As a rule, the

stages are longer where traffic is thin. This is based on the theory that it is better to run a bus three-quarters full with low fares than only one-quarter full with a higher fare.

Asked as to the operation of the Chicago Bus Company, the witness stated that the figures given out showing large profits were greatly exaggerated, for last year little more than $18,000 was set aside for depreciation on the fifty buses owned. After allowing the proper amount of depreciation there would be little or no profit, even with 10-cent fares. With regard to the Fifth Avenue Coach Company in New York, where fares are also 10 cents, it was stated that in the early years of operation it had made no money, but in the past few years it was able to show some profit. However, if all riders took the long hauls for pleasure, the company would be bankrupt, and it was only the short riders along the Fifth Avenue shopping district that made it possible for the company to show a profit.

Questioned by Commissioner Wehle regarding the operation of buses in the lower East Side district of New York, the witness said that a lot of people would ride on the buses who did not patronize the slow storage-battery cars. But he did not think the service would pay with the 5-cent fare now being charged. The fare should be about 5 cents per mile on cross-town buses, he said.

Tuesday's Session

Ralph S. Bauer, who is a large dealer in office supplies and furniture in Lynn, Mass., was the first witness to appear before the commission at its sitting of Tuesday morning. Mr. Bauer said that he considered the street railway problem as purely a social one rather than one of transportation. The solution of the problem could be brought about from no other viewpoint. He thought it was entirely wrong to try to finance a street railway by collecting fares from the car riders and that for this reason the industry from its very beginning has been on a fundamentally wrong basis. He considered that every time a car rider came to the business section of a city, he did so as a messenger of prosperity and for the purpose of doing something by which the community as a whole was benefited, and for this reason he should not be taxed at all for the ride.

He declared that people who had derived the greatest benefits from the street railway—such as the merchant, real estate owner, office building and apartment owner and manufacturer—had never contributed anything to its support. The large department store would be nothing more than a country store without transportation, and the manufacturer could not exist on the same scale or make the same profits that he does today were it not for the service performed by the street railways in transporting the men to and from the factory.

The witness continued this argument at some length and drew the conclusion that because of the enormous investments necessary in street railway properties, any rate of fare which would return a profit to its owners would be so high as to discourage riding. The proper solution, then, is one which will permit of absolutely unrestricted intra-community travel. Later Mr. Bauer declared that next to the public school system the street cars were the greatest factor in the development of any community.

Referring to the service-at-cost type of franchise, Mr. Bauer said that this did not offer a solution since there was no standard by which the people might judge whether or not they were securing a proper service at the cost they were paying. The trustee plan of Massachusetts, he considered "a colossal blunder." The trustees appointed were all lawyers, and none of them was experienced in railway operation. He said that the people in Boston were "riding in the street cars about as they do in ambulances—only when they have to," with the present 10-cent fare, and for this reason the transportation system there was performing its proper public function only two hours out of twenty-four during the day.

The witness considered that if it had been good business for the public to build bridges and roads, it would be even better business for it to take over the street railways as an economic, progressive and rational step. He compared free transportation on the streets to free elevator service in office buildings, stating that those who availed themselves of the latter came to the building to leave something of value, for which the tenants gladly paid.

Mr. Bauer was opposed to the zone system because he thought it tended materially to increase the congestion about important centers of employment. As proof of this, he told of having had occasion to make a check of the number of vacant tenements in the neighborhood of the industrial center of a certain town and to compare this with the number of vacancies in the outlying districts. With a 5-cent flat fare in force, he had found that there were nineteen vacancies in the outlying districts as against 217 in the industrial district. With the adoption of a zone system which had created a 15-cent fare to this outlying district, a second check had shown that there were 109 vacancies in the outlying section and only twenty-seven in the factory district, indicating that the higher fare had forced people back within walking distance of their work.

The witness predicted the passing of the trolley from existence because it was no longer an economic means of transportation in view of the enormous investment involved. While the present buses are very crude and are probably not economic at a fare equal with the street car fare, they would provide an economical means of transportation at a fare of 5 cents. The only way the street railways could be made profitable as a private enterprise, he believed, would be to have the community served pay part of the cost, but he would consider this as only a temporary expedient, pending absolute ownership by the public. Replying to questions about possible abuses of the use of free transportation, he expressed the opinion that such abuses could be regulated in the same manner as we now endeavor to regulate the abuses of our streets and sidewalks.

Massachusetts Trustee Policies Stated

Homer Loring, chairman of the Board of Trustees, Eastern Massachusetts Street Railway, the next witness, outlined the provisions of the Massachusetts act under which the Board of Trustees was operating the old Bay State Street Railway system. He told how the trustees had abandoned operation on considerable mileage of non-paying line and said that there were 150 to 200 miles of additional line on which abandonment of service was being considered, but it was hoped the cities and communities concerned would come forward and help support this mileage. The trustees, he said, were experimenting with various rates of fare and fare systems, and in this the trustees were considering each city as a unit. He referred to the severe jitney competition in New Bedford where the best street car service of any place in the State was being given, and this at a fare of 5 cents, to show that the presence of jitneys was not always due to poor service. He also said most people do not realize the extent to which the automobile manufacturers are exploiting the transportation field. He knew of one department store which had loaned $29,000 to a jitney company to operate bus lines from outlying districts to terminate at that store.

The position of the Board of Trustees on the matter of jitney competition has been that jitneys and street railways cannot both exist in the same city and that the people must choose between them. In this connection he cited a postal-card vote taken on this question in Quincy after the Mayor had flatly refused to do anything toward elimi-

nating the jitneys. To the Mayor's surprise and to everyone's, the vote cast was 700 to 17 in favor of retaining the street railways. He said that the jitney drivers do not make any money and that the ownership of the buses is constantly changing. But the work was pleasant and a man could be his own boss and this induced many to be satisfied with the smaller earnings.

One of the experiments which the trustees have been trying is the use of monthly tickets providing in Fall River fifty rides for $3 within any calendar month, and other tickets giving sixteen rides for $1 in the inner zone of Lowell. These experiments are being conducted in cities where there is no jitney competition.

Asked about the zone system, Mr. Loring said that the trustees were going to try this as soon as they could find a satisfactory way to collect fares, and for that reason they were watching the New Jersey system with a great deal of interest. He believed that it was absolutely necessary, in working out the solution to the situation for the companies to do a great deal of experimenting. For this reason the state commissions must be liberal in permitting the trial of various systems and in looking upon them as experiments. He did not see how the industry could work out its salvation by any other means.

CREDIT THE MOST IMPORTANT CONSIDERATION

Mr. Loring considered the matter of the credit of the street railways as the crux of the present situation. He said that the railways have lost their credit, that credit once lost is very difficult to re-establish and that he is doubtful if the street railways will ever be able to regain their credit under private management. This fact becomes the greatest argument for municipal ownership. He thought that the public was in a state of mind such that it would grant the companies few if any favors and that this was known by investors who were also confronted with much more attractive opportunities for investment in other fields. He thought that the public trustee plan offered a possible avenue through which the State might be justified in assisting in the financial necessity. The only alternative was State or public purchase. He thought that the present trustee plan had practically all of the advantages of public ownership, except possibly for the rate of interest necessary in financing. He thought the plan insured a practically non-partisan management.

Referring to the sentiment in Massachusetts, particularly in Boston, for the return to lower fares, he said that it was so strong that if the Governor had not interfered, the legislature would have undoubtedly passed a 5-cent law at its last session, applicable to the Boston system and probably to the Bay State system.

In connection with operation under the trustee plan, he called attention to the fact that both in Boston and on the Bay State system a large part of the deficit was due to the setting aside of a liberal depreciation reserve. On the latter system, the sum of $1,041,000 is being charged off to the depreciation account, whereas the largest sum heretofore set aside in any one year was $150,000. This fact has a distinct bearing upon the final showing.

Questioned about the good-will element in the prosperity of a company, Mr. Loring said that this was a very vital factor and that the prejudices which the public hold have been a growth of many years. It would take a similarly long time to break them down, so that any relief from this source would be too slow to take care of the present emergency. He said that the introduction of the 10-cent fare in Massachusetts had resulted in a virtual boycott in some cities and that factory employees had jeered their fellow workers who rode the cars. He did feel, however, that when the people of any community were brought face to face with the possibility of losing their street car service, it had a tendency to bring about a very sudden change of public attitude. He felt that the public does not realize how seriously in trouble the electric railways are and that the federal commission could, therefore, do a great service by bringing out in its report a plain statement of the facts.

John A. Beeler, consulting engineer, New York, appeared at the Tuesday afternoon sitting and presented a statement which appears in abstract elsewhere in this issue.

Upon being questioned by Chairman Elmquist as to what was the trouble with the electric railway industry, Mr. Beeler stated that the earnings in recent years had not been sufficient to allow the companies to set aside proper funds for plant replacement. The electric railways have dodged this issue, hoping that something would turn up to solve the problem, and as a result in many cases they are still operating cars that have long outlived their usefulness. Current maintenance will in general take care of the condition of the track, and knowing its life, it is possible to determine just how much ought to be reconstructed each year. Other equipment must be taken care of by a depreciation fund.

Street cars, he thought, should be of a standard type and built as light as possible. After a short period of intensive operation of five to ten years they could be replaced with a later model having improvements. This plan follows the same procedure used by owners of automobiles who after several years of operation sell their machines and purchase others which can be operated more efficiently. If of standard design, street cars can be purchased on an installment basis and payments made entirely out of earnings.

Mr. Beeler said that the minimum fares should be kept at 5 cents and the length of haul shortened to offset any need to increase the minimum unit fare. He also believed that the companies had not taken the proper steps fully to develop short-haul traffic. This, however, cannot be done simply by having a low minimum fare. It is necessary to operate attractive cars, on frequent headways and in charge of properly trained men. In the past he had found that too much attention had usually been paid to seeing that the cars left their terminals on time instead of seeing that they were properly spaced along the main arteries to give a uniform headway. Questioned further as to the various economies of operation suggested in his paper he replied that if the companies would follow these recommendations, their operating expenses would be decreased and the riding habit increased.

Asked as to whether extensions should be financed from increased property value due to the building of extensions, Mr. Beeler stated that in the past some extensions had been subsidized, but as a rule the property owners had put such a high value on their property that the development was necessarily slow and so far as the electric railways were concerned, it would have been better if the extensions had not been built. On being questioned if the service-at-cost plans would be a solution, he answered that the whole question was largely one of financing and management and that as yet the plans had not been tried long enough to warrant an opinion.

With regard to questions concerning municipal and state ownership, especially as to whether such a plan would give better service with more stability, he said that this was a matter of personal opinion but that some advantage might be possible in obtaining credit at a lower rate, but he believed that good management was the most important factor. Under poor management all that was gained by lower money costs would be wasted. Asked by Commissioner Sweet about the social features of the zone plan, Mr. Beeler stated that there were many, but that the principle of paying for the length of ride taken was the ultimate

solution and any fare system which took this into account was a step in the right direction.

Asked by Counselor Warren if one-man cars could be operated in cities of 150,000 population, Mr. Beeler felt that such a type of car could be used exclusively, and even in the larger cities could be operated on certain routes without any difficulty. He spoke of an instance where he had observed as many as eighty passengers on a one-man car during rush hours and compared this to what was considered a big load on a bus, namely, twenty passengers. The one-man car could handle as many passengers as three ordinary buses, he said. In Seattle, it was stated, the traffic was well handled on the one-man cars and in some instances the speed had been increased 20 per cent, the average being from 10 to 15 per cent.

The next witness was Morris L. Cooke, consulting engineer, Philadelphia, and formerly director of public works for that city. He read a prepared statement which is given in abstract elsewhere in this issue.

When questioned by Commissioner Elmquist as to what elements are included in the renewable contract especially as to franchise requirements, fares, rights of purchase, operation and as to return on capital, starting in with good management, he stated that nine out of ten men in this industry are firmly convinced that they now have good management and unless that point of view is changed the problem is hopeless. The idea of management is something that is not static but one that is all the time looking forward to future economies. As to franchises, that matter should be left to the franchise experts. If a company expressed a desire to accept the best advice that could be obtained in the matter of management and then was willing to have a valuation for a showdown, it seems to me a lot would have been accomplished. He called Mr. Mitten's plan in Philadelphia a demonstration of efficient management, which postponed the time when it was necessary to make a valuation, which was he considered good policy.

With regard to municipal ownership, he was opposed to widening at the present time the activities of a municipality, and would be glad to see the present form of operation go forward indefinitely. State regulatory commissions perform two functions, namely, to be the supervisors of electric railways for most of the cities and states and for matters in which more than one city is concerned. He believed that the larger cities should have a street railway commissioner for supervision of what could be done the best locally. The second function would be to standardize accounting practise.

He believed that the service-at-cost plan was a step in the wrong direction and that the promotors of this plan did not realize the temper of the public or the trouble such a plan would get them into. The primary difficulty is that the plan is based on the theory that matters of this kind can be settled by fixing the rate of return but the plan did not take care of the efficiency of management, cultivation of public favor and the solution of the labor problem.

The electric railway, he considered was one of the essential industries and he believed it possible for a regulatory commission to fix a fare for a short period, say three to five years, which would give the company a chance to obtain extra revenue through efficient management and further improvements.

Answering Commissioner Meeker as to why definite standards of work were not utilized in the street railway business, the witness stated that the plan generally followed for training motormen and conductors to a fixed standard was wrong, as it simply made men more or less intelligent automatons. He believed that, having so many employees all doing the same kind of work, the company could benefit by information which the men could furnish from their daily observations and thus, instead of working at all times to a fixed standard, work to a standard that would be constantly changed by improvements due to the elimination of past mistakes. He suggested also the organization of employees in order to obtain greater initiative and believed that the men should call on the manager for such reports, as for instance, the labor turn-over, etc., that they thought would help them in their work. The leaders of the men should demand these figures, for they are entitled to know the reasons for intermittency of employment due to sickness, etc., so that they might be able to offer constructive suggestions to the management.

At the evening sitting of Tuesday, Charles Lomax Delbridge, who claimed to be an auditor by profession and the author of more than 100 publications on accounting matters, appeared as the representative of the Citizens' Referendum League of St. Louis. His object in requesting a hearing was to present to the commission what he declared was absolutely the only solution to the street railway problem, namely, free rides. As a sample of the arguments which he presented to substantiate his contention, the following is quoted:

"The average sum received by steam railroads for all classes of freight is 9 mills per ton per mile. It takes sixteen average people to weigh a ton. Freight has to be loaded and unloaded. People load and unload themselves without expense to the company on street car lines. Yet at a 5-cent fare they pay 80 cents per ton per mile. If they were only charged the freight rate, they would pay only 1 cent for every sixteen passengers. At 5 cents per passenger, people who load and unload themselves pay more than eighty times as much as freight that has to be loaded and unloaded at the expense of the company."

After occupying the time of the commission for an hour and a half the testimony became of such a character that Chairman Elmquist was forced to summarily dismiss the witness.

Wednesday's Session—Labor's Case

In accord with the prearranged schedule to devote the sessions on Wednesday and Thursday to the labor side of the question, Chairman Elmquist called upon W. Jett Lauck at the beginning of the Wednesday morning sitting to proceed with the presentation of testimony. Mr. Lauck acted as counsel for the Amalgamated Association of Street & Electric Railway Employees of America in this matter. He was formerly connected with the War Labor Board as its secretary, and is actively associated with the Bureau of Applied Economics, Inc., Washington, which is making extended studies of costs of living, standards of living, etc.

As an introduction to the testimony to be presented on the labor side, Mr. Lauck outlined the points that he would endeavor to substantiate in the following formal statement.

MR. LAUCK'S STATEMENT

The data and exhibits which we shall submit will cover five main points:

"1. We shall show by an analysis of the operating statistics and performance of the street railways that the present deplorable condition in which they find themselves has not been due to an advance in operating costs arising from increased wage outlays to labor. On the contrary, we shall prove that the productive efficiency of motormen and conductors has steadily increased, and that labor costs of operation have not advanced proportionately with other costs of operation, the increase in the cost of trainmen for each revenue passenger carried ranging only from one-fourth to one-third of a cent during the past eighteen years. Payments to employees in the industry, it will be shown, have had no real effect upon the present finances of the companies.

"2. We shall show that the present financial condition of the street railway industry has arisen primarily from the

past financial mismanagement of these public utilities. We shall submit a brief review of the past financial history of representative street railway corporations, which will disclose the fact that the extraordinary gains in revenue which have arisen from the growth in the population of cities, the granting of special franchises, the development of trade and industry in and around urban centers, the adoption of mechanical devices and improved operating methods, have to a large extent been absorbed by fictitious capitalization, or dissipated by improper or misguided financial management. As a result of these practices, we shall show further that the past productive efficiency of employees has been absorbed by fictitious capitalization, and that, if existing methods and security issues are allowed to be continued into the future, the fruits of the labor of employees as yet unborn will be absorbed by fictitious securities already outstanding. Our conclusion on this point will be that unless the past basis of financial management and control of the industry be changed, the future is without hope to the employees of the street railway companies, or to the general public. We do not charge the present managements with these malpractices, but they are the victims of the acts of their predecessors.

"3. We shall show that financial mismanagement of the street railway companies has invariably been followed by a lack of the proper development of operating efficiency and service to the public, and also by the failure to adopt operating policies which would bring out the maximum of productive effort of the employees.

"4. As to the actual rates of pay received by labor in the industry, we shall show that the earnings of motormen and conductors before the war were actually below a subsistence level and were entirely inadequate to maintain a proper standard of living; that wage increases received during the war by awards of the National War Labor Board and by other agencies and methods were very moderate and that, in general, the cost of living has increased much more since 1914 than the rates of pay of trainmen; that, as a consequence, the earnings of trainmen are even more inadequate now than they were before the war and not sufficient to maintain a standard of living based on health and reasonable comfort; and, finally, that the wage increases received in other industries during the past five years have been greater than those secured by motormen and conductors, and that, out of approximately 100 leading industrial occupations, conductors and motormen have the smallest rates of pay of any other group of workers.

"5. Finally, we shall submit evidence to show that our own government, by official proclamation of the President during the war, and the leading industrial and commercial nations of the world, by their sanction of the labor clauses in the peace treaty since the armistice, have accepted as fundamental rights of labor the principles of an eight-hour day, a living wage, and union recognition; and we shall contend that these principles are no longer debatable and that this commission should accept these principles as an essential condition to any recommendations which it may make for the rehabilitation of the street railway industry.

"When this testimony has been completed we shall ask Mr. Mahon to set forth his own reconstruction ideas."

CONDUCTOR TESTIFIES ON ATTITUDE TOWARD CONTRACTS

Counsellor Lauck then called upon Cary Ferguson to take the stand. Mr. Ferguson testified that he had been a conductor on the Detroit United Railway for fifteen years prior to the last two years, during which he has been business agent of the local union. He presented a formal statement as follows:

"We appear before you for the purpose of presenting information upon two subjects; first, as to the policy of the Amalgamated Association in making and living up to written contracts with the employing companies; and, second, to inform you as to the conditions under which the street and electric men of America are compelled to work. We have evidence to show that our work is arduous and our hours are long, and for that purpose we have brought with us schedules which will show the working conditions in Cleveland and Detroit, which, in our opinion, are typical of the working conditions prevailing throughout the United States.

"We desire first to call your attention to the policy of the Amalgamated Association in making and adhering to its written contracts for the reason that we have noted in reports on the evidence submitted to your commission that there has been some criticism and the claim has been made that our association did not adhere to its contracts. The following extract from the report of our international president to the Chicago convention, which was held during September, 1919, best explains our policy on contracts and the number of them which are in existence.

> "The policy of our association to secure written contracts covering wages and working conditions for a given period with the employing companies has been followed during this term as it has in the past with good and satisfactory results. * * * The reports at the Providence convention two years ago showed that we had at that time 250 written contracts with the different employing companies. During the past two years seventy-six other divisions have secured written contracts with their respective companies, which brings the present total of written contracts between our local divisions and employing companies to 326.
>
> "Now my advice is that the policy of securing written contracts be continued. * * * It is the rudder by which we steer this organization successfully, and therefore its continuance in my opinion is necessary to the success of the organization.

"Now as to the policy of our organization to live up to its contracts, we would inform you that the great majority of our locals have adhered to and strictly carried out their contracts. There have been three or four cases where our local divisions have acted contrary to this principle. It might also be pointed out that several street railway companies have refused to adhere to their written contracts and have violated them, not only with our association but in some cases with the municipalities in refusing to further continue under the terms of their franchises.

"The policy of our association is clearly shown in the case of the Bay State Street Railway where several of our divisions in violation of their contracts suspended work in the month of June of this year. The records show that both our international president and the general executive board of the association compelled these organizations to return to work and adhere to their contracts. Another case is that of Pittsburgh, where only a few weeks ago the local division refused to comply with its contract arrangements and went on strike, but due to the position taken by our international president and the general executive board, they were also compelled to return to work and adhere to their contract. At our September convention, this matter was brought up in the report of the international president as follows:

> "I would remind you that the integrity of this organization is at stake. In the past we have borne the reputation of living up to our contracts. If contracts are to be disregarded and our laws cast aside we cannot ask anyone to have confidence in us and by such actions we will be destroying what we have struggled for for years, namely, the right of collective bargaining. It is a serious matter and one that calls for consideration and action at your hands.

"In considering this subject the convention fully indorsed the position taken by the international president and the general executive board, and laid down the policy that in the future our locals must strictly live up to their contracts if they were to remain a part of the Amalgamated Association of Street & Electric Railway Employees of America."

In discussing the schedules of Detroit which he considered typical of the industry, Mr. Ferguson pointed out that

many of the men are required to put in a greater number of hours than they are paid for, due to the fact that but 37 per cent of the runs are continuous, the majority being two-piece or three-piece runs, so that they are required to be on duty more hours than they work. The average pay-time for the schedule of runs submitted, which was the one used in the 1917 Grinnell arbitration proceedings, was nine hours and twenty-eight minutes. Conditions have changed, he stated, to some extent up to the present time, for all runs having an outside time of twelve hours or more pay for nine hours and twelve minutes.

Comment was also made on the fact that men who had completed their regular runs were called upon to work trippers and this was disagreeable to the men even though they received a higher rate of pay for such work.

Criticism of the time of day they are released for mid-day meals was also made. The witness stated that this period ought to be in the middle of the day or as near noon as possible, instead of early in the forenoon as was now the case on many runs. He suggested that a large percentage of the runs should be continuous inasmuch as runs having a large spread of hours do not allow the men to perform properly their work. Long hours cause too great a strain especially on motormen operating cars through crowded streets.

Asked if the work was so arduous that the health of the trainmen broke down under the strain, the witness spoke of the fact that some men in his own local had to seek other employment on account of the nervous strain. Questioned as to whether motormen and conductors should be considered as performing a skilled trade, the witness believed so, for the highest rate of pay was not received until after one year of service, and especially on interurban lines where the men had to have some mechanical knowledge regarding car equipment.

CLEVELAND CONDUCTOR DISLIKES NUMEROUS TRIPPER RUNS

The second labor witness was William M. Rea of Cleveland who for the past seven years has been financial secretary of the Cleveland local. Previous to that time he had been a conductor for eight years. Mr. Rea presented information to show that in Cleveland the men also had to work long hours to complete the runs as laid out by the company, and that a great many of the runs required a man to do the first swing in the morning rush hour and the last swing in the evening rush hour, for which he was only paid a minimum guarantee of five hours.

Under the service-at-cost plan, effective in Cleveland, the headways on various routes for different periods of the day are mapped out by the street railway commissioner, and the company must operate cars according to these headways. This has required a large number of trippers which are operated by the extra men, and which pay only the five-hour guarantee. On being questioned, Mr. Rea stated that the average number of days work per year by trainmen was about 325 and that they operated under an agreement or contract which was similar to those entered into by the association in other cities.

Questioned as to why men stick to street railroading, the witness stated that after a man has been on the cars for any considerable length of time he is not in proper condition to take up any other work that requires physical strength, and that in Cleveland about 80 per cent of the men have been in service eight years or more. Questioned by Commissioner Gadsden regarding the attitude of the public on fare increases, he stated that the laboring classes objected more to the increases than the business men, because they had to pay a higher rate of fare, due to the fact that most of them had to transfer to reach their work and this meant an extra charge of 1 cent for the transfer. No violence has resulted at any time due to increase in fares. This the witness believed was due to the educational work carried on through the newspapers which explained fully how the service-at-cost plan worked.

When questioned as to whether all the savings in Cleveland were at the expense of the men, the witness explained how the schedules were fixed by the street railway commissioner and that the company in complying with them had speeded up the cars to such an extent that men who formerly made but eight trips for ten hours pay, now had to make nine trips and were paid less per trip.

Asked as to the effect of the Tayler ordinance on the wage increases, Mr. Rea explained that the men conferred with the company as is usual at other places, and that the street railway commissioner took no part in any such conferences. However, he pointed out that wage increases could only be granted by the company subject to the approval of an increased operating allowance by the City Council. When questioned further as to whether it was easier to get wage increases under the service-at-cost plan, he said that it was to the company's interest to try to keep the wages down as much as possible. Asked especially if there was a feeling on the part of the men that any increase would be passed on to the public through increase in fares, so that they might as well get all they could, he answered in the negative. He said the relations between the company, the men and the City Council were most cordial.

STATISTICAL EVIDENCE

Arthur Sturgess, consulting engineer of Boston, and formerly administrative examiner in charge of the administration of street railway awards of the National War Labor Board, then took the stand to present an extended statistical study of the labor aspects of the street railway business. An abstract of his testimony and some of the charts which he presented will be published in a later issue of ELECTRIC RAILWAY JOURNAL. In general his aim was to show the greatly increased efficiency of labor, and that the increases in wages have been much smaller in proportion than the increases of other costs and therefore are not responsible for present conditions. Upon the conclusion of his testimony, the commission remarked that his study was so complete and comprehensive that it had no particular cross-examination to make.

In explanation of some of the statistical matters which Mr. Sturgess had presented, Mr. Lauck gave an indication of what the aims of the Amalgamated Association are with respect to wages. He said that it was the intention to ask for wages even higher than an amount sufficient to offset the increase in cost of living since 1914, for the 1914 scale was less than the cost of living, so that an increase in wages simply large enough to take care of the increase in living expense would only perpetuate the inadequacy of the 1914 scale. Mr. Sturgess had previously made the statement that the wages prevailing in December, 1918, would have had to be increased more than 16 per cent to bring them up to the then living costs.

PLACING WAGES ON A BUDGET BASIS

Prof. W. F. Ogburn of Columbia University, formerly special agent in the United States Bureau of Labor Statistics and later connected with the War Labor Board, was the next witness. He first endeavored to show the extent of the increase in the costs of living since 1914, arriving at the conclusion that for the country as a whole this increase had been between 75 and 80 per cent from June, 1914, to September, 1919. He then turned to the question of standards of living and said it would be unfair to adjust wages on the basis of the increased cost of living alone. He presented a very able discussion on what constituted a "minimum subsistence standard" of living and defined this

standard as one based on a scale of wages such that, any industry paying a less scale was parasitic. He said that the minimum wage considerations were based on this standard, and then endeavored to explain how this level of living was scientifically determined. In this explanation he referred to infant mortality, nutrition, housing conditions, etc., as indices used in establishing the standard.

In connection with the cost of foods, he brought out that to supply a proper diet per adult for the average family of man and wife and three children, required an annual expenditure of $575 in 1914 and $700 to $750 at the present time. This represented the necessary expenditure for proper living for food alone, which was usually considered to consume 45 per cent of the laboring man's total budget. Analyzing very carefully various factors entering into the average budget, he reached the conclusion that for the minimum subsistence standard of living, it was necessary for a man to earn between $1,500 and $1,700 a year under present conditions. From this he proceeded to the discussion of better standards of living, the next step being termed the "minimum comfort standard" of living.

The budgets used in his discussion for these two standards of living are as given in the accompanying table, as they were prepared to cover the conditions of 1918.

MINIMUM SUBSISTENCE BUDGET

Food	$615.00
Clothing—Man	76.00
Clothing—Woman	55.00
Clothing—Eleven to fourteen years	40.00
Clothing—Seven to ten years	33.00
Clothing—Four to six years	30.00
Rent	180.00
Fuel and light	62.00
Insurance	40.00
Organizations	12.00
Religion	7.00
Street-car fare	40.00
Paper, books, etc.	9.00
Amusements, drinks, and tobacco	50.00
Sickness	60.00
Dentist, oculist, glasses, etc	3.00
Furnishings	35.00
Laundry	4.00
Cleaning supplies	15.00
Miscellaneous	20 00
	$1,386.00

MINIMUM COMFORT BUDGET

Groceries	$533.40
Fuel	60.00
Clothing—Man	90.50
Clothing—Woman	87.00
Clothing—Girl of eight or nine	32.50
Clothing—Boy of fourteen	48.50
Clothing—Boy of five or six	33.00
Maintenance of household equipment	40.00
Education	11.00
Church—Fraternal dues	20.00
Medicine—Doctor, dentist	60.00
Insurance	30.00
Reading matter, music	*
Savings	100.00
Gas	20.00
Electric light	15.00
Rent and water	184.00
Street-car fare	35.70
Tobacco, ice cream	30.00
Recreation—Movies, etc	30.00
Incidentals—Stamps, barber, etc	25.00
Miscellaneous	20.00
	$1,505.60

* See Education.

Much of the information used by the witness in his testimony was taken from two pamphlets called the "Changes in Cost of Living, 1914-1918," and "Standards of Living," prepared by the Bureau of Applied Economics, Inc., Washington, D. C., both of which were offered in evidence to the commission. These two pamphlets constitute a compilation or summary of the existing data on the two subjects.

Professor Ogburn continued his testimony at the evening session on Wednesday, regarding the standards of living and the minimum comfort budget. The latter, he stated, was as much a reality as any other budget and that compared to the bare subsistence level it merely provided slightly more for comforts such as insurance, clothing and sundries. He brought out that in the preparation of all budgets, families are considered as consisting of a man and his wife and three children for the reason that upon death of the parents, two children would be left to maintain the present population and that the third child was considered only as a factor of safety to insure of maintaining this rate. Another point covered was that all families were considered as renters, and it had been found that the workers who owned their own homes were put to a somewhat greater expense than when they rented their living quarters. Mr. Meeker confirmed this fact and stated that it was true even though interest on their house mortgages were not included in such figures.

After explaining in detail how many calories of food for an adult male are usually purchased at various incomes, the witness stated that street car employees need at least 3500 calories of food daily to properly sustain them in their work, which he considered as being "rather hard." Sacrifices, he said, which must follow extraordinary demands on a household due to sickness, etc., are usually first made by the mother who then does not have the proper nourishment or clothing. The children are usually the last members of a family to feel any affects of pinched living.

Mention was made by Professor Ogburn of the use of budgets in determining proper wages, as was done in Seattle and Oakland, Cal., in two arbitration cases concerning wages of street car employees. He believed that wages to be adequate should be based on a minimum comfort budget. This would call for a present-day income of approximately $2,000 per year, and if applied to an eight-hour day and 325 working days per year, would make an average hourly rate of 80 cents for motormen and conductors.

On being questioned by Mr. Gadsden, he stated that the War Labor Board in its awards had based the wages of the lowest paid labor on a minimum subsistence budget of $1,300. This was based on an eight-hour day with one or two hours of overtime, giving an hourly rate of approximately 42 cents. Mr. Gadsden pointed out that this was the minimum rate granted street railway employees by the War Labor Board.

That Trainmen Are Poorly Paid, Is Claimed

Leifur Magnusson, an economist interested in labor matters and employed for the past nine years in the government service, was the next witness. He presented as evidence a bulletin entitled "Wages in Various Industries," prepared under his direction for the Bureau of Applied Economics. In this bulletin he attempted to bring together all the available information regarding rates of wages paid in as many industries as possible during the course of the war, that is between 1914 and 1919. He referred particularly to a table contained therein showing the maximum rate paid motormen and conductors, which he stated had been compiled from various trade and labor publications. The table was arranged by cities and it gave a comparison of the wages paid in 1911, 1914 and 1919. The 1919 wages given were intended to be the latest so far as ascertainment was possible, but Mr. Warren brought out that many of his figures, especially for New England companies, had been changed and also stated that this might be true of any tabulation due to the fact that at the present time rates were changing so rapidly.

Taking all the scales of wages shown and striking an arithmetical average, which came out 42.5 cents per hour, Mr. Magnusson drew the conclusion that this average rate when applied to an eight-hour day would show that the 1919 daily earnings of trainmen were less than in any other class of unregulated employment except that of the trapper boys in the coal mines of the Hocking Valley district. The manner in which this average hourly rate of pay was arrived at was challenged, since the table included many cities as separate companies which were really part of a large system, thus making a high divisor and producing a correspondingly lower average. When asked concerning rates in other forms of regulated industries, he advised that he could not furnish any comparative figures.

By further deductions from this same table, he testified that the percentage increase in trainmen's wages during the past five years was only 48 per cent and that this was lower even than the increases granted to compositors in the printing trades or bricklayers in the building trades, both of which were only slightly affected by the war.

Thursday's Sessions

Stiles P. Jones, a newspaper editor of Minneapolis and formerly an administrator of awards for the War Labor Board, took the stand Thursday morning for the purpose of testifying on the over-capitalization phase of the street railway situation. Mr. Jones began his testimony by reading a prepared statement as follows:

"The present unfortunate predicament of the street railway industry in the United States is one in large part of its own making, created primarily by past financial mismanagement over which the public had no control and for which in this issue it cannot justly be held responsible.

"A study of the financial history of many representative companies discloses an amazing story of financial manipulation clear through the life of the properties, the results of which have been to load them down with a staggering burden of over-capitalization to constitute a permanent charge against operating revenue. The ingenuity of the financial management in creating new sources of capitalization has been without limit. Nothing has been overlooked upon which to hang new issues of securities.

"The inevitable result is seen in the present undermining of the financial structure of street railway investments in this country. The credit of the industry is so impaired that it can no longer finance its enterprises on possible terms. It is facing collapse through its own devices.

"The methods and agencies by which this unfortunate situation has been brought about frame a sordid background of ruthless exploitation of a great public-serving industry to make financial killings for manipulating insiders. Unwarranted promoters' rewards, excess construction costs, consolidations, mergers, reorganizations, leases, stock bonuses, have all been made the medium for capital inflation. Franchise values, excess earnings, prospective future earning capacity, discounts on securities, even operating deficits, have been capitalized to further add to the burden. Every operating improvement, the increased efficiency of employees, the growth and development of the community and of industry have been to a large extent used as a means to absorb fictitious issues.

"The effort to protect the integrity of these false values has absorbed the efforts and resources of the companies in such measure as to make it impossible for them to fulfill their primary function as public-serving institutions. Indeed, the operation of the properties—the vital point of the public interest in the street railway question—has been seriously affected by the financial mismanagement. Excess operating costs and bad service have gone along hand in hand through the years with bad financial management, while just wage increases have been held up because of the prior claim of the investor, irrespective of the character of such claim.

"At the door of financial mismanagement lies the responsibility for the present status of the street railway industry in this country. It cannot rightly be charged to increase in labor costs. The effort to unload the burden on to labor and the public has no justice in fact."

Mr. Jones supplemented this formal statement by further direct testimony to the effect that the general over-capitalization of the industry resulted in (1) impaired service to the public, (2) impaired operating efficiency, (3) in the robbing of maintenance to meet fixed charges and operating expenses, and (4) in so affecting the attitude of the public that any amicable settlement was exceedingly difficult. He stated that this attitude of the public was due to (a) the belief that the street railways were generally grossly over-capitalized, (b) to the refusal of the railways to lower fares in other better days, (c) to the attitude of the companies in this crisis toward their public contracts, (d) to the arbitrary attitude of the companies toward the public, and (e) to the political activities of the companies.

Mr. Jones then submitted in exidence an exhibit entitled "Financial Mismanagement of Street Railways," which comprised an extended compilation of literature from various publications bearing upon this subject. In addition to the evidence formed by this literature, the exhibit included summaries showing the over-capitalization of about twenty specific properties, for which the figures used were claimed to have been taken almost entirely from official sources. The properties which Mr. Jones included in citing specific cases of over-capitalization were the Public Service Railway of New Jersey, Chicago Surface Lines, Pittsburgh Railways, United Railways of St. Louis, Bay State Street Railway, the Baltimore Company, Indianapolis Street Railway, United Railways of San Francisco, the Rhode Island Company, Los Angeles Railway Corporation, Denver Tramway, Philadelphia Rapid Transit, Cleveland Railways, San Francisco-Oakland Terminal Railways, New Orleans Railway, the two companies in Washington, D. C., the Lincoln Traction Company, Milwaukee Electric Railway & Light Company, and the Scranton Railway.

Explaining that the capitalization per mile of track was not an entirely fair basis of comparison, owing to the many variables entering into that figure, Mr. Jones included in this exhibit a chart showing this comparison in twenty-seven states. With the properties in Massachusetts as a base of comparison, the witness stated that the excess capitalization for the country as a whole per mile of track in 1912 was 82 per cent. In 1902 he stated that the excess capitalization per mile of track was 146 per cent.

Mr. Jones then endeavored to explain the various methods which have been employed for inflating the capitalization of street railways. Referring to the Public Service Railway, he declared there was 53 per cent inflation of securities. Commissioner Gadsden interposed a question as to whether the Public Service Commission of New Jersey did not have all of these facts before it when it handed down its recent decision for zone fares. To this the witness replied that it did have. Mr. Lauck, counsel for the labor side, explained that they considered the matter of over-capitalization very largely a past episode and were only interested in pressing that phase of their case because they wanted to show that if it were continued it would so absorb the proceeds of operation as to affect the income of labor.

Commissioner Gadsden then asked the witness if the generally accepted sound capitalization of the Massachusetts companies had resulted in any better wages for the trainmen, to which the reply was in the negative. Commissioner Beale asked the witness if it were not true that a large part of the capitalization of the San Francisco company was due to the necessity to almost completely rebuild the system after the earthquake. Mr. Jones admitted that this undoubtedly was a factor.

In answer to questions by Chairman Elmquist, the witness stated that he believed over-capitalization was practically a universal condition with all companies, varying only in degree. He said that he knew of no company that was not over-capitalized. The chairman then questioned him as to the manner in which he arrived at this conclusion and it was brought out that his study had covered only twenty companies, the witness explaining that he had taken only those companies where it was possible to draw fair conclusions. The chairman asked him if it were fair to draw such general conclusions from so limited a number of cases and the witness replied that he thought these were

representative. He was then asked if he had found any valuation which was equal to or in excess of the capitalization, to which he replied in the negative.

Asked if he thought that over-capitalization had resulted in any extra burden upon the public, the witness replied that it had resulted in enormous profits to promoters and that the industry has been dominated not by the motive of public service but by large profits for the insiders. He was then asked if the promoters held the stock of the companies to any extent and he said that he could not answer but that it was his impression that they got the profits and then unloaded the burden on innocent investors.

In answer to further questioning by the chairman, the witness brought out that the public does not know the companies are largely over-capitalized but that it instincts it and that the affect is distrust and antagonism. He pointed out that the co-operation of both public and employees is necessary to successful management and that with the prevalance of distrust it was impossible to obtain the best treatment from either.

Valuation and Capitalization Difference Not Fair Evidence

Commissioner Sweet then questioned the witness, bringing out his acquiescence to the thought that there might be a large difference between the actual value today of a property and the capitalization, where there has been no reprehensible conduct involved. This was due to the factor of obsolescence which has absorbed great sums of capital. From this admission, it was brought out that the evidence of the witness did not take into account what was legitimate over-capitalization and what was not, and that unless the basis of valuation were known the bare differences between present capitalization and present actual value was not a fair basis on which to charge dishonesty or the presence of watered stock. The witness, however, contended that the factors of obsolescence and other intangibles had usually received important consideration in arriving at valuations, so that he thought such valuations gave one the right to the opinion that unfair methods of capitalization had been pursued when there was any marked difference between value and capitalization.

Commissioner Gadsden referred to the similar evidence of over-capitalization presented by Mr. Welsh of the American Electric Railway Association, which showed the existence of an average of 10 per cent of water in the capital of twenty-six companies. He also pointed out that this earlier exhibit showed that the companies operating in Atlanta and Denver, and the Chicago, North Shore & Milwaukee Railway, had been officially valued at a figure higher than their capitalization. The commissioner said that the same criticism applied to the evidence submitted by both the railways and labor, the former having picked out the low spots and good ones, while the latter had pictured the high spots and bad ones.

Commissioner Meeker asked the witness, in view of the enormous discrepancies in the valuations arrived at by various experts, if he still had faith in using this as a basis for determining the amount of water. The witness replied that if the valuation was official he believed it to be approximately just, as far as physical value was concerned, assuming that the valuation was made by engineers of good reputation who had a reasonable interest in the public service and had given reasonable recognition to the intangibles.

The question was then raised as to labor's direct interest in the matter of over-capitalization and the witness explained that public and labor were both concerned, for if a company was hard up someone was going to be squeezed, and this usually meant a reduction in wages or a reduction in service, or both. Counsellor Lauck further explained that the interest of labor and the public was subordinated to the prior interest of capital, and that labor was not getting an adequate participation in the earnings because its part was being absorbed through the interest charges resulting from the capitalization of earning power, or the hypothecation of future earnings.

Counsellor Warren then asked the witness if it were not true that a large part of the mileage of the Massachusetts railways, which had been used as a base in the comparison of over-capitalization, was built on public highways so that the roads involved a much less cost for rights-of-way than was involved in other states, where the roads are built more generally on private rights-of-way. The witness replied that this might be true.

Brief of Labor Case

W. Jett Lauck, counsel for the Amalgamated Association, took the stand at the opening of the Thursday afternoon session.

In summing up the testimony of the witnesses who testified in behalf of the Amalgamated Association, Mr. Lauck very carefully reiterated all of the conclusions which they made, and in some cases drew further conclusions to show the tendency of the demands of the organization for a wage high enough to afford the minimum of comfort and an eight-hour day and one day's rest in seven, preferably and whenever possible on Sunday. To meet these conditions, it was brought out, would give as a minimum wage, about $6 per day. An abstract of his brief follows:

With regard to labor and the present financial plight of the street railways, a review of the past history of street railway companies disclosed the fact that gains in revenue due to growth in the population of the cities, the adoption of improved operating methods and the increasing work and efficiency of employees, have been largely absorbed by fictitious capitalization of improper or misguided financial mismanagement. Had these companies been properly managed and the earnings conserved, they would now be in a very prosperous condition and the operating revenues would be sufficient even on a basis of a 5-cent fare, not only to pay attractive returns on the capital actually invested, but to provide for new financing and a living wage to employees. The wages paid employees have had no affect upon the present finances of the companies. The employees have not received the fruits of their labor, in that they have not had a fair participation in the revenues, and unless the present basis of financial management and control is changed, the future is without hope to the employees of the street railway companies. The commission should in any recommendation take judicial notice of these conditions.

Advances in the rate of pay to employees has not brought about the present condition of the street railways, for even prior to the war the wages paid the motormen and conductors were inadequate. During the past five years they have not received an increase to correspond with the increased cost of living. Even if they had received this increase, it would still mean that an entirely new plan would have to be evolved, for the wages paid would fall far below the minimum comfort level. If wages are to follow cost of living, it is necessary to take into consideration any future increase and also the minimum living wage. The conclusion reached by Mr. Sturgess in his testimony, that wages of motormen and conductors had only increased 48 per cent, while the cost of living had gone up 72 per cent, refuted the statement made by the railways that the War Labor Board had put the street railways "on the rocks." It is maintained that the awards which were made by the War Labor Board were only moderate, and barely covered the then increased cost of living.

In taking what was construed to be a living wage, the old theory that wages should be based on supply and demand of labor was wrong, for labor should no longer be viewed as a

commodity, whose value is determined in the same way as is the value of wheat, coal, iron and steel. If the old plan was still followed the only way that labor could find any relief was to shut off the supply, as occurred during the war when so many men were called into service, or to cause the collapse of industry. So far as workmen were concerned, the law of supply and demand is a dismal theory, for it does not enable them to advance their own welfare or that of their dependents.

Every wage earner is entitled to a living wage, which should not be merely a subsistence rate of wage but a wage sufficient, after meeting the minimum physical needs of food, clothing and shelter, to leave a balance sufficient for a small degree of comfort and to enable a wage earner to secure some reasonable measure of health, recreation and education. The demand for a living wage is a fundamental, economic right and a sound principle accepted by all the leading civilized and industrial countries, as embodied in the League of Nations. It is the principle accepted by our own government as the one which should govern the relations of labor, and it should be considered by the Federal Commission in any report that it makes. The average rate of pay and earnings of conductors and motormen are inadequate at a bare subsistence level, and are not sufficient to support an average family in health with any degree of comfort. Even as far back as 1907 families with incomes ranging from $800 to $900 were able to maintain a normal standard of living only in so far as the physical needs of food and fuel were concerned. The wages of street railway employees, considering the increases granted during the period of the war compared to the increased cost of living are, therefore, at the present time even more inadequate than before the war. An advance in wages equaling the entire increase in the cost of living since 1914 would only put the present wages on a pre-war basis and simply perpetuate pre-war inequalities. A living wage is now needed and the rates of pay should be established on a scale which will guarantee all employees the fundamental right to health and reasonable comfort. We have no idea that the commission will recommend any definite wage scale but our purpose is to call these matters to the attention of the commission and show that the necessary income for the maintenance of an average family should be approximately $2,000, such an income would simply provide for a healthy existence, a little comfort and a small saving.

Mr. Lauck then presented the following:

Constructive Recommendations of Labor

The constructive problem before the Federal Electric Railways Commission has three main features:

1. The electric railways of the country claim they are being operated at a loss and the insolvency and collapse of the whole industry is impending. They estimate their deficit for the year 1918 at $24,000,000. They claim that they have not a sufficient margin of net returns as a basis for securing much-needed new capital or for tiding themselves over their present difficulties. They state that they have exhausted every plan and device for protecting themselves against a financial catastrophe. Outside assistance and fundamental methods they assert are now necessary. Governmental or, in other words, public aid alone, they believe, can save them. They have stated, in the language of the president of the American Electric Railway Association, that "it is no longer a question as to what return shall be allowed to the owners of the street railways; it is a question of what service, if any, shall be rendered to the public." Under the stress of this emergency the commission is, therefore, faced with the duty of devising measures to put the electric railway transportation industry upon a sound financial basis. This means that the industry must be put on a basis of honest capitalization, the key to which is really fair valuation.

2. In the second place, the financial reorganization of the industry involves a readjustment of the relations between the public and the electric railways, and,

3. A readjustment of relations as between the public and the companies and the employees. The attitude of the organized employees is that in reorganizing and rehabilitating the industry financially; and in working out new relations with the public, the commission must also accept and recommend as essential preliminary conditions certain standards of work and compensation, and certain modifications in relations between the industry and its employees, which are justified by the fundamental economic rights of the employees.

Measures for Immediate Relief

From what has already been stated as well as from the detailed testimony placed before the commission, it is clear that some fundamental change in the permanent control and operation of street railways is necessary, involving perhaps a reorganization of the owning or operating corporations and a departure from the present relations between the industry and the public. It is claimed, however, owing to the necessary delays in securing legislation or the official sanction of the proper public bodies before a fundamental change in policy may be put into effect that some immediate measures must be adopted, such as a flat increase in fares, or a campaign of education of the public to a more intelligent conception of the street-railway problem, so that a greater spirit of co-operation may be secured.

The wisdom of such a program is extremely doubtful. If it should seem necessary it should be conditioned on the preparation and announcement of a permanent, fundamental policy, and should be undertaken with great caution. It should really be done only in connection with the advocacy of a comprehensive program. Otherwise, an advance in fares may become merely the means of perpetuating for a time old inequalities and injustices, or temporarily postponing the final day of reckoning, and an educational campaign of the public may degenerate into partisan propaganda for an unrestricted increase in fares.

A temporary agreement and contract between the street railways and the municipalities with the constructive plan recommended by the commission as a basis might be made pending final determination of value as a basis for a permanent agreement and permanent policy of operation. Such a procedure would afford immediate financial relief where needed without prejudicing the rights of the public, the employees, or the companies.

The Fundamental Principle Involved

The paramount interest in the entire situation is the public interest. It is dependent on the street railways. The public cannot permit them to cease operation. The transportation facilities are too vitally bound up in their daily lives and activities. The public, therefore, is forced to act.

The present emergency has only stimulated and brought into the foreground the significant relation between the street railways and the general public. The realization of this truth has been steadily developing. In former years, electric railways were looked upon as purely private enterprises. They were regulated only on the ground that they were monopolies. Their securities were, to a large extent, speculative, and offered, because of the monopoly control of the companies and the extraordinary growth of towns and urban centers, unusual opportunities for speculation, manipulation, and large returns. Street car passengers were looked to by the companies as a source of revenue and profit.

With the growth in urban life, however, this original conception gradually changed. The trend of opinion came more and more to the conviction that the street railways were social institutions. The modern view, entirely aside from the present plight of the railways, has come to be that the street transportation industry is a public institution serving as highways or common carriers for the people. If this is the generally accepted view at the present time, and the testimony before the commission clearly shows that it is, the practical question is: What measures shall the commission recommend not only to rehabilitate the industry financially and conserve the properties, but also, what constructive policies, permanently to develop and maintain the most economical and efficient facilities for the use and convenience of the public. The fundamental point, in other words, how can the street railways be best rehabilitated, operated, and developed for the benefit of the people, due regard being had for the fundamental and proper interests of capital invested in the properties and of labor employed by the street railway companies. The public is undoubtedly willing to pay for the efficient operation of street railways on the basis of just guarantees to capital and labor. The problem of the commission is to consider all facts and constructive proposals and to recommend, with these just guarantees to labor and capital in mind, a practical scheme of reorganization and operation of the industry.

The Fundamental Rights of Capital

Capital has the right to demand that its investment, in so far as it has been actually and prudently made and honestly administered, should be not only conserved but, if the public should acquire any or all of the properties, that it should re-

imburse the owners for the actual values, or, on the other hand, if the public should only operate and not acquire the properties outright, that capital should receive a reasonable and proper rate of return.

The value of the actual investment and proprietary rights of capital or of the owners or investors in the street railway properties can be readily ascertained. Furthermore, the actual rate of return which may be guaranteed on these values by the public can be readily determined. There is no practical obstacle in the way, in short, to the public satisfying all the just claims of capital, or the owners or investors in the street-railway industry, should the commission recommend that the public acquire or operate the properties.

THE RIGHTS OF LABOR

The employees have as direct and more vital interest in the prosperity of the industry than even the investors of capital. Should street railways become insolvent, the owners of capital might suffer a heavy pecuniary loss. The employees on the other hand would lose their immediate means of livelihood. Furthermore, many of the employees have spent a number of years or a lifetime in the service of the industry. They have devoted their working years to the acquisition of training and experience which they could not sell as advantageously in other lines of industrial employment. They may be said, therefore, to have a vested interest in their positions on the street railways which is even more valuable and vital to them than the vested interest which capital has is to the owners of street railway securities.

The employees are, therefore, anxious to have the industry rehabilitated and made prosperous. They are desirous of having the public protected because the public interest is paramount. They insist, however, and too great an emphasis cannot be put upon their contention, that the reconstructive policy undertaken must be based upon and accept as a fundamental preliminary, the rights of labor, as accepted by all civilized and leading industrial nations in the treaty of peace with Germany, and the principles which have been accepted and proclaimed by our own government as those which should govern the relations between employers and employees.

The principles relative to labor, or the charter of industrial democracy, which have been embodied in the Peace Treaty, are as follows:

"1. The guiding principle above enunciated that labor should not be regarded merely as a commodity or article of commerce.

"2. The right of association for all lawful purposes by the employed as well as by the employers.

"3. The payment to the employed of a wage adequate to maintain a reasonable standard of life as this is understood in their time and country.

"4. The adoption of an eight-hour day or a forty-eight-hour week as the standard to be aimed at where it has not already been attained.

"5. The adoption of a weekly rest of at least twenty-four hours, which should include Sunday wherever practicable.

"6. The abolition of child labor and the imposition of such limitations on the labor of young persons as shall permit the continuation of their education and assure their proper physical development.

"7. The principle that men and women should receive equal remuneration for work of equal value.

"8. The standard set by law in each country with respect to the conditions of labor should have due regard to the equitable economic treatment of all workers lawfully resident therein.

"9. Each state should make provision for a system of inspection in which women should take part, in order to ensure the enforcement of the laws and regulations for the protection of the employed."

FUNDAMENTAL GUARANTEES REQUIRED BY EMPLOYEES

In order that there may be no misunderstanding as to the attitude of the employees of the street railways, the principles which the employees insist shall be embodied in any recommendations by the commission as to a constructive program for the street railway industry may be briefly summarized and further explained. They are as follows:

1. The Right to Organize, or Union Recognition.

The time has passed when collective bargaining can or should be interpreted in any other way than as to mean the recognition of trade unions or labor organizations. As urged by employees, it means union recognition. They do not contemplate, neither will they accept committee systems promoted and installed on the initiative of street railway officials for the reason that they know that any such systems of collective bargaining do not really safeguard the interests of labor, and cannot, therefore, permanently endure or be permanently effective. They demand the recognition of the rights of the employees to organize into labor unions, and to deal with the companies with accredited representatives. This does not necessarily mean the adoption of the closed shop principle, but does mean that the street railway managements shall conduct all negotiations as to wages, working conditions, and relations with a recognized labor organization. In localities where the employees of the companies are not already organized into unions, it shall be the duty of railway managers not to discourage the employees to form labor as a means of dealing with the management.

This principle as to union recognition is no longer a debatable issue. It has been sanctioned by the society of civilized nations. Furthermore, it is absolutely essential to that form of co-operation between street railroad managements and employees which will lead to efficient, economical, and stable operation, and, as a consequence, is to the highest degree of real service to the public.

2. The Establishment, on the Basis of a National Standard, of a Living Wage for the Employees in the Industry.

This is also no longer a controversial issue. As in the case of union recognition, it has been accepted by the enlightened opinion of the civilized world. It is not only essential to the general well-being of the employees, but it is equally essential to the rehabilitation of the industry, for it is one of the necessary conditions to the enlightened co-operation and participation of the employees in making the industry a success from every standpoint. It also means a great advantage to the localities in which street railways are located, for it would lead to an elevation of the standards of civic life and public conduct among street railway employees.

Testimony has been submitted during the course of the proceedings of the commission to show that in order to maintain a minimum standard of health and a reasonable degree of comfort the earnings of street railway employees should amount to an average of at least $2,000 annually. This amount may vary from locality to locality and be changed by further investigation. The figures submitted, however, are designed to be merely illustrative of a minimum standard. The employees do not especially desire the commission to recommend any definite amount. The principle of a living wage is what we are contending for and which we wish to be accepted and sanctioned by the commission. The amount may be adjusted later between the companies and the unions. We insist that it is a fundamental right of the employees which the commission should sanction and recommend as a necessary condition to the general rehabilitation of the street railway industry.

3. The Eight-Hour Workday.

The establishment of an eight-hour day is also an essential preliminary, from the standpoint of the employees, to any reconstruction of street railway properties. This standard has also been accepted by representatives of the leading nations in the labor provisions of the peace treaty. President Wilson in several speeches has set forth his reasons in general as to the justification of an eight-hour day for workers on public utilities, as follows:

1. Because it is right.

2. Because it has the sanction of organized society as shown by the history of labor legislation and the judgment of the courts, and,

3. Because of enlightened self-interest—the employer would find that it would pay because it would bring about greater co-operation and greater production from his working forces.

His remarks in urging the Adamson law bear out these assertions. Several pertinent quotations from his remarks may be submitted in this connection:

"You know that we have been a legalistic people. I say with all due respect to some men for whom I have a high esteem that we have been too much under the guidance of the lawyers, and that the lawyer has always regarded the relations between the employer and the employee as merely a contractual relationship, whereas it is, while based upon a contract, very much more than contractual relationship. It is a relationship between one set of men and another set of men with hearts under their jackets, and with interests that they ought to serve in common and with persons whom they love and must support on the one side and on the other. Labor is not a commodity. It is a form of co-operation, and if I can make a man believe in me, know that I am just, know that I want to share the profits of success with him, I can get ten times as much out of him as if he thought I were his antagonist. And his labor is cheap at any price. That is the human side of it, and the human side extends to this conception, that that laboring man is a part of his employer. If he is a mere tool of his employer, he is only as serviceable as the tool. His enthusiasm does not go into it. He does not plan how the work shall be better done. He does not look upon the aspect of the business or enterprise as a whole and wish to co-operate the advantage of his brains and his invention to the success of it as a whole. Human relationships, my fellow citizens, are governed by the heart, and if the heart is not in it nothing is in it.

"Because a man does better work within eight hours than he does within a more extended day, and that the whole theory of it, a theory which is sustained now by abundant experience, is that his efficiency is increased, his spirit in his work is improved, and the whole moral and physical vigor of the man is added to. This is no longer conjectural. Where it has been tried, it has been demonstrated. The judgment of society, the vote of every legislature in America that has voted upon it is a verdict in favor of the eight-hour day.

"The reasonable thing to do is to grant the eight-hour day, not because the men demand it, but because it is right, and let me get authority from Congress to appoint a commission of as impartial a nature as I can choose to observe the results and report upon the results in order that justice may in the event be done the railroads in respect of the cost of the experiment."

Along with the eight-hour workday should obviously go the further recommendation of the commission that employees should also have "a weekly rest of at least twenty-four hours, which should include Sunday whenever practicable."

These in general are the fundamental rights and standards which the employees insist should be an indispensable part of any recommendations of the commission. They are essential to any plan of rehabilitation or successful operation of the street railways.

Pittsburgh Mayor Gives Views

The cross examination of Mr. Lauck was postponed in order to hear Mayor E. V. Babcock of Pittsburgh, who presented a statement, an abstract of which appears elsewhere in this issue. The Mayor was accompanied by Mr. Robinson, Corporation Counsel of Pittsburgh who joined in the testimony of Mr. Babcock.

Mayor Babcock, upon completing his address, was questioned by the commission concerning the recent strike of the trainmen and he explained very fully the various stages of the troubles which commenced last May when the men asked for an increase in wages. The public and the men were both much incensed over the use of strike breakers, and while there was no material disorder the men soon realized what they had done and went back to work. During the strike, he said, it was necessary to use all sorts of vehicles as a means of transportation and it was very clearly demonstrated that the street cars were necessary to the social life and welfare of any community and that the city would not be worth a nickel without them.

When questioned regarding the valuations recently made by the company and the Public Service Commission, he stated that the actual capital claimed to be invested in the street railway companies was in the neighborhood of $160,000,000, although this included some duplication in the underlying companies, and that the actual investment was approximately $110,000,000.

With reference to paving requirements and other indirect charges of similar character, the Mayor stated that the United States District Court had already relieved the receivers from paying these costs and he believed that the city should not place a great deal of significance either way on this matter. He had no personal opinion as to which was the better way for such things to be taken care of, for in the last analysis they must be paid by the public. He believed, however, that the public would be better served if the cities or communities had some authority in fixing fares and suggested a plan whereby it might be advisable for the cities and companies themselves to determine the proper rate of fare. In case this was not possible, recourse could be had to some regulatory body such as the present Public Service Commission. He believed that the cities knew their transportation conditions and needs better than the Public Service Commission. He took this same stand in connection with the building of extensions.

On being questioned further, he claimed that the service-at-cost plan provided no incentive for the railway managers to operate the property at the lowest possible cost, and while he was familiar with the plans proposed for Montreal and Cincinnati, he really believed that the proper plan had not yet been evolved. All of these plans fail if the basis on which they are built changes, and the whole arrangement is likely to be discarded and the management punished for something over which it has no control.

In speaking of the rates of fares charged by the Pittsburgh Railway, especially with regard to the so-called territorial preference plan, he said that the public objected to it because people in certain sections of the city were allowed to ride a greater distance than in others, even at a lesser rate of fare. The system, however, did produce a 15 per cent increase in passenger revenue.

The territorial preference system was changed last August to a flat fare with free transfers within what had been previously the inner area. Reduced-rate tickets are also sold in lots of four for 30 cents, giving a ride for 7½ cents without transfer privilege. This fare, which was a 50 per cent increase, was estimated to produce an increase in the passenger revenue of 35 to 40 per cent over the revenue received under the 5-cent fare. This increase it will be noted, is considerably nearer the theoretical increase than was received from the previous fare, although only 5 to 6 per cent of the passengers carried pay the 10-cent cash fare. The company estimates that the cost of operation even with an allowance of $1,000,000 for depreciation, will be met with only a small deficit if its estimates hold true. These were based on the earnings from Aug. 1 to Sept. 22, taking out the twelve-day strike and allowing for a subnormal riding habit immediately following the strike. The witness stated that he believed the riding habit would be further increased when a settlement has been reached regarding the true valuation, as this will create a better public feeling.

When questioned concerning zone fares, the Mayor stated that he was very much opposed to this system of basing rates, as he believed that it would build up one part of the city at the expense of another while a flat fare with transfer privileges would affect the whole city equally. He thought an 8-mile haul would be proper for a flat fare as this would be likely to take in the major portion of the district served by the company. However, he stated that a bill had been introduced in the Legislature to make Allegheny County a metropolitan district, in order to have the question of transportation in the district treated as a unit, instead of as so many municipalities, each trying to follow its own ideals. This bill, however, was defeated.

Incentive Is Lacking for Efficient Management and Investment of Capital

At the evening sitting Mr. Robinson took the stand, directing his thoughts to the cost-of-service idea in which Pittsburgh is now particularly interested. He explained that he believed there ought to be an incentive to the management for efficient operation as well as an inducement to capital to invest in plant which would bring about better operating economies. He said it was this incentive which was lacking in the Cleveland plan and that he did not think the Cincinnati plan would work out to provide an incentive in actual practise, although it sounded well on paper. He thought the latter plan was largely a loser, whatever the operating conditions, and said that he had never been able to put down on paper how the various factors of this plan would actually work out, applying the principles stated in the franchise. There seemed to be two opposing principles.

He thought that it was desirable to have a fixed rate of return on old capital but that the return for new capital should be left open in order to meet the varying conditions of the money market and to provide the necessary inducement to attract capital for special economy-producing expenditures, which must usually be of a junior security character. He thought that the necessary incentive to capital might be provided by the simple arrangement of setting up a certain rate of return for a fare of, say, 8 cents, then adding 4 mills

to the rate of return per dollar for each 1 cent reduction in fare. This plan would probably include a limit upon the rate of return, both upper and lower.

CROSS-EXAMINATION OF LABOR'S COUNSEL

W. Jett Lauck was then called back to the stand. Commissioner Elmquist pointed out that great stress had been laid upon financial mismanagement and asked Mr. Lauck to explain labor's interest in this side of the question. The witness said that past financial mismanagement has been largely responsible for the present situation, and that there must be brought about a complete readjustment in order to protect the employees as well as the public. In answer to further questioning the witness admitted that the introduction of the minimum comfort standard of living, calling for an annual wage of $2,000 and resulting in a scale of 80 cents per hour for platform labor, would very materially add to the cost of production. This would necessitate either an increase in rates or a subsidy from the public. Mr. Lauck reiterated what he had said several times before that the labor side was not asking for an increase of wages to 80 cents an hour or any specific increase, but was simply asking for recognition of the principle. Chairman Elmquist interposed that to accept the principle would be the same as acknowledging that this additional cost would be added, to which the witness agreed. Mr. Lauck said that the principle ought to be adopted irrespective of the cost, even if it meant that the railways would thereby be placed in the hands of receivers, for this matter, as held by the War Board and upheld by the courts, had no bearing on equitable wages.

Asked if the Amalgamated Association would consent to a reduction of wages, if the cost of living went down and thereby lowered the minimum comfort budget, the witness replied he thought it would if that was a condition upon which the budget wage was granted.

Commissioner Meeker then asked the witness if it were not true that in considering the service-at-cost plan there was a tendency to over-emphasize the matter of automatic adjustment of rates and obscure the more important managerial problems and relations with labor. He stated that well-fed, healthy, happy employees would bring greater efficiency, greater co-operation and desire to serve, which would absorb some of the increased labor cost. The witness confirmed this and made considerable point of the great opportunity there was for managerial savings, saying that more contented employees would take a keener interest in saving of fuel and making other economies which the manager might introduce. He then cited an example of two companies operating in the same city, one of which was unionized and the other not, and said that the unionized company was very prosperous and the men were courteous to the public and the company's relations with the public were amicable; whereas the other company was in financial straits, and the employees were most discourteous and did not seem to care when or how they got their cars over the line, and that the company was most unpopular.

Commissioner Mahon interrupted to say that there was proof from every industry that the eight-hour day and better wages do improve the efficiency of labor.

Commissioner Sweet then asked the witness if the acceptance of the labor recommendation that all companies should be unionized, would not upset the Philadelphia plan where there was every indication that the men were satisfied, were receiving good wages and that the company was in a healthy condition. The witness answered that the Philadelphia plan could not result in permanent good to the employees; that it had been his experience that such organizations promoted by the company, always broke down when the organization attemped to get something from the company, for it had no bargaining strength.

The witness was then asked how the adoption by the commission of the three recommendations presented by labor would relieve the street railway situation. He replied that this would not help at all unless the recommendations were accompanied by other aid, including reorganizations and complete change of the attitude of the public to the industry and of the industry to the public and labor. He considered that these recommendations should be included as an essential part of the financial rehabilitation, since they would have a good effect in securing the necessary co-operation and eliminating the constant friction, which will be present without the execution of these recommendations. He said that these recommendations would, of course, add further to the burdens of the companies unless a long time financial rehabilitation was brought about, and that labor's recommendations had been made contingent upon such rehabilitation and assuming that it was needed.

Commissioner Sweet questioned further about the effect of the recommendations upon the Philadelphia plan, and the witness reiterated that such company organizations without affiliation with the national union were fundamentally unsound both from the interest of the public and of the employees, since the latter were not able to protect their own interests. The paternalism of the company involved in such cases was offensive to self-reliance and men did not like it and only wanted a proper opportunity to work out their own welfare. He said that companies which endeavored to evade unionism, by "beating the union to it," only fooled themselves. He attributed the successful operation of the company in Philadelphia very largely to the extra traffic brought by war industries, and to the ideal conditions existing for low operating costs, including the heavy density of traffic, rather than to the working of the men hand in hand with the company. He thought that the Philadelphia success with labor had been exaggerated.

WHY NATIONAL UNION IS NECESSARY

Mr. Sweet then asked if it was the witness' idea that the great advantage of affiliation with the national union was that it provided the fighting power of the Amalgamated Association with which to combat the greed and antagonism of the company. The witness replied that this was not his idea, but stated that the employees had not had their proper share and that if the principles enunciated in the recommendations were adopted, this would eliminate friction and antagonism between the company and men and secure co-operation. Commissioner Sweet pressed his question further by asking if the fighting power of the union was not superfluous, provided there was good co-operation and fellowship on both sides, and where a company had accepted the enlightened principles embodied in the peace treaty for the purpose of bringing industrial peace. The witness reiterated his previous reply that a local collective bargaining plan could not be permanently successful.

Mr. Sweet then stated his personal opinion that if the recommendation of the union meant the undoing of the plan in operation in Philadelphia, which represented the best example in the street railway field at present, and in comparison with which the witness was unable to cite any unionized company which was enjoying equal success, then he could not see how the recommendation of labor could be adopted.

This inadvertent expression of opinion on the part of the commissioner called forth a rebuke from Commissioner Mahon, and precipitated the beginning of a speech in behalf of labor. But Chairman Elmquist was firm in restoring order and directing that the cross-examination of the commissioners among themselves would be reserved for executive session.

Mr. Lauck confirmed an interrogatory statement that the rehabilitation of the companies was as important to the general public and to the employees as it was to the management, and emphasized this by saying that the employees

have a vital concern and do not want to obstruct but rather facilitate the solution of the problem. He said the success of any solution depends upon the public.

Commissioner Sweet then asked if it would be wise for the commission to load its report with anything that would tend to antagonize the public or prevent or militate against the financial rehabiliation of the industry. The witness replied "No," but said that if the inference was that the inclusion of the labor principles in the commission's recommendation would antagonize the public, then it was his opinion that the commission would be a derelict in performing its public duty if it did not recognize these principles.

Friday's Session

Mr. Lauck was recalled to the stand for further cross-examination in which most of the commissioners participated, and it was brought out that street railway labor, including clerks, stenographers and trainmen, were contending for an eight-hour day with a wage of $6.40 per day or $166.40 per month, whether organized or not.

Relative to the wages for the lowest class of labor in the street railway industry, the witness stated that the War Labor Board had placed the rate at 40 to 42 cents per hour and for motormen and conductors had added 3, 4 or 5 cents depending on the locality, although no rates less than 42 cents had been granted. Questioned as to differentials for skilled labor, including trainmen, Mr. Lauck could not express an opinion as to what they should actually be, but stated that those at present in effect should be maintained, based on the 100 per cent increase to common labor.

As to the effect on other industries of an 80 cents an hour rate in the street railway industry, Mr. Lauck believed that such a rate should apply to all industries, and that it was a fallacy to say it would increase the cost of living, for the public agreed that labor was entitled to a living wage. As to the effect on street railway fares, he contended that capital was entitled to a fair return, and that the public would pay the necessary increased fares or would cover any decrease in revenue by the remission of taxes and assessments.

Questioned with regard to the Philadelphia plan, he called it "a form of corporation feudalism," for the employees only obtained what the company believed was good for them. He also stated in this regard that the policy of labor was not only national but international and that trade unionism was more favored than any local form of organization and that unions gave protection to their members in that they had benefits covering sickness and death.

In answering Commissioner Wehle, the witness stated there was at present no movement in the Amalgamated to increase the effectiveness of union labor, but he believed that if the demands for a living wage and an eight-hour day were in effect, it would be an incentive for the fullest co-operation with capital, provided the management also used every effort to decrease the costs of operation. As to how this was to be obtained, he stated that the management should lay down qualifications for the holders of all jobs and it would be the duty of the labor leaders to see that union members met these qualifications otherwise they would be dismissed. Commissioner Mahon pointed out that this plan was written into a number of contracts between the railway companies and the Amalgamated and that if, after a probation period, the prospective trainmen did not measure up to that standard they were discharged.

The witness was asked whether labor would co-operate, if the American Electric Railway Association were to recognize the claims of labor and offer a constructive plan to care for the future, including effectualization of management. He stated that it is the right of the public to expect the fullest production, for their interest was paramount.

In speaking of whether an increase in compensation dependent on gross earnings would act as an incentive for increasing production, Mr. Lauck thought this might be practical, although he questioned whether a profit-sharing scheme with participation by the management might not be held in distrust. He called attention, however, to the plan in effect in England during the war where managers and employees, through joint adjustment boards, co-operated and materially reduced the costs and at the same time increased the piece-work rates paid shipyard employees.

In conclusion, he stated that the success of any plan must be predicated on the demands of labor for a living wage. In advocating these principles as a part of the bill of rights for democracy in industry, he conceded that the rights of the public were paramount, but that labor should not be treated as a commodity. The Amalgamated Association, he stated, had refrained from establishing any specific rate of pay, but did ask the commission to recognize these principles so that the various street railway managements could work out the details.

After the cross-examination of Mr. Lauck had been completed, Commissioner Mahon stated that he did not believe it was incumbent upon him to take the stand, inasmuch as he was a member of the commission. However, statements showing the benefits of the association would be prepared by Mr. Lauck and filed for the information of the commission.

MR. MORTIMER COMPARES THREE 5-CENT CITIES

J. D. Mortimer, president North American Company, then took the stand at the request of Mr. Warren for the purpose of submitting further data and information to clarify certain references which had been made to Cleveland and other cities.

Mr. Mortimer said that the testimony during the earlier part of the week suggested that the cost of service plan under the Cleveland franchise was not tending to produce as good results as the reputed methods of co-operative management in Philadelphia. He called attention to the fact that the Philadelphia management had at no time said that it did not need more revenues than could be produced by the 5-cent fare. What the Philadelphia management said was that the company wished more passengers at 5 cents rather than fewer passengers at a higher fare. There are few electric railway operators in the country who feel otherwise about the matter. We all want more traffic rather than less. We would all like to carry sufficient traffic at 5 cents to make the business remunerative. Mr. Mortimer said:

"It is impossible for the Federal Electric Railways Commission to draw any accurate conclusions from the testimony so far presented concerning the Philadelphia situation, or the general railway problem. It has been suggested that the 5-cent fare in Philadelphia with 3-cent transfer charge at some points is producing satisfactory results. The 5-cent fare is no doubt quite satisfactory to the people of Philadelphia when contrasted with the higher fares which are being paid in many other cities. The opportunity has been left with the commission to infer that this fare is satisfactory to the Philadelphia Rapid Transit Company, and that the reason that the company during the year 1918 and during 1919 to date has gotten along without any increase in fares is because of the type of management, involving a high degree of co-operation between management and employees.

"In my opinion the reason that the 5-cent fare has apparently given satisfaction is based upon entirely different grounds. Whether or not it is remunerative will be disclosed by the figures which I will submit later. There is no more justification for attaching what are reported to be satisfactory results from a 5-cent fare to the co-operative management than there is to say that Cleveland is successful because the motormen and conductors belong to the Amalgamated Association. It would be just as proper to

say that the low rate of return in Milwaukee results from large production of beer, or that the 5-cent fare in Philadelphia is satisfactory because there formerly was a large proportion of Quakers in that city.

"It might also be alleged that the 5-cent fare in Philadelphia is more satisfactory to the management of the Philadelphia Rapid Transit Company than it is to the management of the Cleveland and Milwaukee companies, because the municipality is constructing a rapid transit system and has not yet made arrangements for its operation, while there are no such rapid transit systems under construction in Cleveland and Milwaukee. The question of adequacy or inadequacy is far more fundamental than the form of collective bargaining used in dealing with employee."

Mr. Mortimer referred briefly to the principal features of the so-called Tayler ordinance, under which the Cleveland railway system is operated, and said: "While it has been designated as a service-at-cost plan, it is my opinion that it is a service-at-less-than-cost plan, because:

"1. The ordinance does not permit the setting up of any depreciation reserve, and future car riders will accordingly be required to pay for service which is being given to present riders.

"2. Due to replacements of physical property and inability to take care of them through current operating expenses without very largely increasing fares, the company is required to suspend the amounts and thereby show continuously a condition of insolvency.

"3. The 6 per cent interest provided for in the ordinance is inflexible and does not today cover the costs of capital for investment in street railway utilities.

"4. In the event that the municipality does not buy the property or indicate its intention of so doing, or extend the franchise beyond 1935, then the security holders are subject to a large hazard involving readjustment at the end of 1935, and they may be subjected to the same proportionate reduction in the value of their assets, as was the physical property of the company at the time of the Johnson-Goff appraisal in 1909, where about $7,500,000 was written off the value of the property.

"5. The plan under which the number of cars for service is determined does not lead to satisfactory conditions of car loading, nor of frequency. The standards of car loading applied in Cleveland call for a larger proportion of standing passengers than is permitted by any standards ordered or recommended by any regulating authority. The question of standards of service has a very important bearing upon the rate of fare.

"6. The conditions under which trainmen are required to operate involve short runs as low as five hours in duration with spreads of duty up to fifteen hours which are not favorable and in turn have an important bearing upon the cost of service."

Analysis of Philadelphia Operation

Touching on the Philadelphia situation, Mr. Mortimer said:

"The reasonableness of the present revenues of the company at a 5-cent fare with 3-cent transfer could only be determined by making an analysis of the cost of service. An analysis of the cost of service requires information respecting the fair value of the property. There is no information before the commission pertaining to such value, but for the purpose of my testimony such value could be assumed to lie within certain limitations.

"Assuming that the value was as low as $120,000,000, an amount equivalent to about four times the gross earnings, it will be necessary to add to the operating expenses, as shown by the company's income account, an amount equivalent to about $3,000,000 for additional allowance for replacements. If this sum is deducted from the amount reported to be available for the payment of interest, rentals, dividends, etc., then the company failed to earn its interest charges, rentals, etc., by $1,385,000. Instead of having earned something more than 5 per cent on the capital stock of $30,000,000, par value, it incurred a deficit of about 4 per cent. If the expenditures for maintenance in per cent of operating revenue were brought to the approximate figure of the Cleveland company, there would have to be deducted another $1,500,000. If, on the other hand, the value is placed at four and three-quarter times the gross earnings, or $152,000,000 a figure somewhat in excess of the net outstanding capitalization of the Philadelphia Company and all leased companies, an allowance of 2½ per cent would require a further deduction from income of $3,800,000 per year.

"If this deduction is made, the net operating revenues would be $7,515,000, equivalent to about 5 per cent on the assumed property value of $152,000,000, or short $2,165,000 of paying interest and rentals. Under this later computation, if we add to the deficit of interest and rentals the amount required to pay the dividend upon the stock of the operating company, revenues would have to be increased $3,665,000 on the basis of the 1918 results, an amount equivalent to about 12 per cent of the 1918 revenues, or about 6¼ per cent.

"I have no sympathy with some of the testimony introduced on Thursday, charging that the rentals paid by the Philadelphia Company for leased lines were excessive. It is impossible for any person not intimately conversant with the fundamental facts of value to say whether or not such rentals are excessive. The people of Philadelphia have benefited largely through the unification of the system, and the rentals which are now being paid are a part of the cost of unification.

"Philadelphia is an attractive street railway city because of its distribution of population and industries, tending to reduce the average length of haul of passengers and resulting in a larger use of equipment, through rush-hour cars carrying loads both ways."

Mr. Mortimer felt confident that any competent management in Philadelphia would find further opportunities of improving service and saving expense through rerouting and elimination of parallel lines, but also expressed the opinion that none of these economies would permit the company to earn a fair return upon a fair value at the present rates of fare.

The witness pointed out that the schedule speed was 8.95 in Philadelphia, 8.98 in Milwaukee and 10.43 in Cleveland. The higher schedule speed in Cleveland has been one of the most important contributing factors to the results which are being achieved there. The high schedule speed and large proportion of standing passengers, the absence of any depreciation reserve and the low rate of return were the distinguishing features of the operation of the Cleveland Railway. High schedule speed and large proportion of standing passengers were brought about initially at the instance of the city through its street railway commissioner and have been substantially maintained by the city's co-operation. The return earned on the utility capital in Cleveland during the year 1918 was estimated by Mr. Mortimer at 5.2 per cent, a sum which in his opinion is materially less than that required to attract capital into the business.

At the afternoon hearing on Friday, Mr. Mortimer continued his direct testimony by introducing a rather complete comparison of the various factors in the operation of the companies in Philadelphia, Cleveland and Milwaukee. In making this comparison he commented that it was unfortunate that there was no measure of the service rendered in various cities, so that to say the service in one city was more satisfactory than that in another was a very meaningless statement. The comparative operating statistics which he introduced are given on page 110.

OPERATING STATISTICS FOR THE YEAR ENDED DECEMBER 31, 1918

	Philadelphia Rapid Transit Company	Cleveland Railway Company	The Milwaukee Electric Ry. & Lt. Company
POPULATION			
Population served	1,735,000	810,000	425,000
Population served per mile of single track operated—revenue track only	2,808	2,360	2,356
Average riders per capita of population served per annum	316	337	268
Average passenger revenue per capita of population served, per annum	$17.94	$14.90	$12.63
GENERAL			
Investment in property and plant per dollar of annual operating revenue	?	$3.30*	$2.98
Per cent operating payrolls to operating revenues	42.06	?	43.87
Per cent current ordinary maintenance charges to operating revenues	14.25	19.15	16.89
REVENUE			
Operating revenues per mile of single track operated—revenue track only	$50,369	$36,043	$29,753
Operating revenues per revenue car-hour	$3.27	$3.49	$2.90
Operating revenue per revenue car-mile, cents	36.51	35.17	32.34
Passenger revenues per revenue passenger, cents	5.61	4.42	4.66
Passenger revenue per revenue and transfer passenger, cents	3.97	3.23	3.33
PASSENGER			
Total passengers	767,758,406	375,570,360	160,369,803
Revenue passengers	543,984,458	273,944,346	114,149,000
Transfer passengers (3 cents)	88,681,603	.....	.....
Transfer passengers (free)	130,472,269	100,022,519	45,709,197
Free passengers	4,620,076	1,603,495	511,606
Per cent of free transfer passengers to revenue passengers	24	37	40
Per cent of free transfer passengers to total passengers	17	27	28
TRAFFIC			
Total miles single track owned and leased	669.38	385.30	195.67
Miles single track operated, owned or leased—revenue track only	617.78	342.33	180.34
Miles single track other than revenue track	51.60	42.97	15.33
Revenue passenger cars owned	2,862	1,469	576
Revenue car-hours	9,518,735	3,536,016*	1,847,403
Revenue car-miles	85,226,151	36,875,603	16,591,121
Revenue car-miles per revenue car-hour	8.95	10.43	8.98
Revenue car-miles per mile of single track operated—revenue track only	137,950	107,719	91,999
Revenue car-hours per revenue car	3,326	2,407	3,207
Revenue car-miles per revenue car	29,778	25,102	28,804
Revenue car-miles per annum per capita of population served	49.12	45.42	39.02
Revenue passengers per revenue car-mile	6.38	7.47	6.88

* Includes $8,278,909 depreciation on investment excluded in ordinance settlement.

* Estimated from reported speed.

	Philadelphia Rapid Transit Company	Cleveland Railway Company	The Milwaukee Electric Ry. & Lt. Company
INCOME			
Operating revenues	$31,117,477	$12,338,906	$5,365,805
Operating expenses	20,369,571	10,216,228	4,940,364
Way and structures	1,738,740	1,117,293	390,192
Equipment	2,287,207	1,184,516	524,341
Power	3,128,814	1,199,905	898,669
Conducting transportation	8,951,880	3,877,569	1,960,835
Traffic	111,117*	.....	.....
General and miscellaneous	2,182,861	1,372,530	446,114
Depreciation	319,998	744,000	404,810
Taxes	1,871,175	720,413	315,401
Net operating revenues	10,747,906	2,122,677	425,440
Investment	?	40,613,320	15,991,305
Per cent return on investment	?	5.20	2.66
EXPENSE			
Total operating expenses (including taxes)	$20,369,571	$10,216,228	$4,940,364
Per mile of single track operated—revenue track only	$32,972	$29,843	$27,394
Per revenue car-hour	$2.14	$2.88	$2.67
Per revenue car-mile, cents	23.90	27.73	29.77
Per 1000 revenue passengers	$37.40	$37.38	$43.26
Per 1000 revenue and transfer passengers	$26.50	$27.20	$30.81
Per capita population	$11.74	$12.61	$11.62
Way and structures	$1,738,740	$1,117,294	$390,192
Per revenue car-hour, cents	18.27	31.57	21.12
Per revenue car-miles, cents	2.02	3.03	2.35
Per 1000 revenue passengers	$3.20	$4.08	$3.42
Per mile single track operated, revenue only	$2,814.49	$3,263.79	$2,163.65
Equipment	$2,287,207	$1,184,517	$524,342
Per revenue car-hour, cents	24.03	33.50	28.38
Per revenue car-mile, cents	2.68	3.21	3.16
Per 1000 revenue passengers	$4.20	$4.34	$4.58
Per revenue passenger car owned	$799.16	$863.42	$910.32
Power	$3,128,814	$1,199,905	$898,669
Per revenue car-hour, cents	32.87	33.93	48.65
Per revenue car-mile, cents	3.67	3.25	5.42
Per 1000 revenue passengers	$5.75	$4.39	$7.85
Conducting Transportation	$8,951,880	$3,777,569	$1,960,835
Per revenue car-hour, cents	94.04	109.66	106.14
Per revenue car-mile, cents	10.50	10.52	11.82
Per 1000 revenue passengers	$16.46	$14.16	$17.18
Wages of Trainmen	$7,094,518	$3,243,346	$1,540,892
Per revenue car-hour, cents	74.54	91.72	83.41
Traffic	$111,117*	.....	.....
General and Miscellaneous	$2,182,862	$1,372,530	$446,114
Per 1000 revenue passengers	$4.01	$5.04	$3.90
Per cent of operating revenues	7.01	11.13	8.33
Depreciation	$319,998	$744,000	$404,810
Per 1000 revenue passengers	$0.59	$2.72	$3.54
Per cent of operating revenues	1.03	6.03	7.55
Taxes	$1,871,175	$720,413	$315,401
Per 1000 revenue passengers	$3.44	$2.64	$2.76
Per cent of operating revenues	6.01	5.84	5.88

* Credit.

Having concluded his direct statement Mr. Mortimer was asked a number of questions by the commissioners which served to bring out more fully his ideas in regard to the proper provision for maintenance and depreciation under the service-at-cost plan and to the difficulty involved in bringing about a public appreciation of its railway system. In this latter respect, he compared Cleveland, where all of the municipal officials are constantly boosting the service in the public eye and leading people to think they are receiving the best service in the world, with Milwaukee, where the Mayor, Common Council and city attorneys' office are not only not co-operating with the company but are constantly attacking it and making accusations of bad service, enormous earnings, etc., regardless of the facts.

Mr. Mortimer also explained in answer to further questioning that there was no local of the Amalgamated Association in Milwaukee and that the Employees Mutual Benefit Association had all the power of collective bargaining. He said that this organization had been organized to prevent strikes but that it had not been effective, for the employees of the company struck in January of this year. As an outcome of this strike, the State Legislature enacted a law providing a permanent arbitration board, to which all matters of dispute of this character are to be referred. It is intended that this board shall, after investigating any dispute, transmit its finding to the State Railroad Commission. If the commission finds that the utility can earn the increased wages, if the board approves an increase, the commission has power to order the company to grant the increase. If the commission finds that the utility cannot earn the increase, the law provides that it shall establish rates which will enable the company to pay the increased wages and make a reasonable return on the investment.

PHILADELPHIA TAKES THE STAND AGAIN

Mr. Joyce of the Philadelphia Rapid Transit Company was then called to the stand again to present certain data which the commission had requested when he testified earlier in the week. The witness first presented a letter from T. E. Mitten, president of the company, as shown on page 111.

Mr. Joyce also presented a table showing the comparative earnings and wage scale for the years 1910 and 1919 for the companies in Philadelphia, Detroit and Cleveland.

EARNINGS AND WAGE SCALE, 1910–1919

	Philadelphia			Detroit			Cleveland		
	1910	1919	Increase Decrease*	1910	1919	Increase	1910	1919	Increase
Trainmen.....	7,424	6,264	*15.6%	1883	2,900	54%	2,083	2,745	31.7%
Average rate per hour paid trainmen.	0.23c.	57,65c.	151%	27c.	57.51c.	113%	0.28c.	.59c.	110.71%
Gross earnings of Co. per trainman.	$2,590	$5,508	112.6%	$3,311	$5,345	61.4%	$2,867	$5,442	90%
Average pay per day	.....	$5,51	.....	.....	$5.10	.....	.....	$5.00	.....
Average rate of fare	4.13c.	3.98c.	*3.6%	4.09c.	5c.	22.3%	2.63c.	3.91c.	48.7%
Passengers carried per trainman	62,711	138,383	120.7%	82,114	106,896	30.1%	109,020	137,197	27.6%

NOTE: Philadelphia figures are actual. Detroit and Cleveland figures are derived from the best available information.

PHILADELPHIA RAPID TRANSIT COMPANY

EXECUTIVE OFFICES
1035 LAND TITLE BUILDING

T. E. MITTEN,
Chairman, Executive Committee

PHILADELPHIA, October 2, 1919.

HON. CHARLES E. ELMQUIST, *Chairman*,
Federal Electric Railways Commission,
Washington, D. C.

Agreeable to Mr. Joyce's promise to supply additional information relative to working hours of motormen and conductors, and also our ability to continue the 5-cent fare, the following data is submitted:

Working Hours of Motormen and Conductors

Philadelphia's surface lines have no three-piece runs.

The system comprises 2473 regular runs, of which 1323, equalling 53.5 per cent are straight runs and 1150, equalling 46.5 per cent, are two-piece runs.

The average over-all time per run is 11 hours, 33 minutes.

The average pay-time is 9 hours, 30 minutes.

The average lost time is 2 hours, 3 minutes.

The pay-time is divided as follows:

Hours per Day	No. of Runs	Percentage
8- 9	611	24.7
9-10	1285	51.9
10-11	530	21.4
11-12	47	2.0
Avg. 9.5 hrs.	2473	100.0

Ninety-seven per cent of all car operating time is worked as a part of regular runs, leaving only 3 per cent to be assigned as trippers. The average pay-time on regular runs is 9.5 hours, requiring 307 days' work per annum to earn the system average for motormen and conductors of $1690 per year.

According to the figures taken from Wednesday's testimony for Detroit in 1917, therein stated to be slightly improved for 1919, the comparison of over-all time at Detroit and Philadelphia is as follows, the average pay-time of both cities being 9.5 hours:

Completed within	Detroit No. Runs	Detroit %	Philadelphia No. Runs	Philadelphia %
13 hours	865	62.5	1808	73.1
14 "	195	14.2	513	20.7
15 "	147	10.6	135	5.5
16 "	77	5.7	17	0.7
17 "	51	3.7	....	....
18 "	46	3.3	....	....
19 "	1	....	....	....
	1382	100.0	2473	100.0

Continuance of the 5-Cent Fare

The wage increase of August 7, approximating $2,500,000 per annum, was in full effect during the entire month of September. Operating results for September are significant, showing as they do that the proportionate amount of all yearly charges and 5 per cent dividend has been earned, with a continued 5-cent fare—operating ratio (excluding taxes) 61.55 per cent.

Co-operative effort, with a force of well-trained employees, of which 85 per cent receive the maximum rate and 55 per cent are more than five years in service, is here found adequate to overcome obstacles seemingly insurmountable elsewhere.

T. E. MITTEN, President.

In answer to questioning by the commissioners, Mr. Joyce testified that the longest ride for 5 cents in Philadelphia is 14.2 miles. The average earnings of the men on the extra list per week during the month of August, 1919, had been $26.30. The gross earnings of the company for September, 1919, were $3,070,000 as compared with $2,728,000 in 1918. The surplus for the month this year was $185,000, as compared with $237,621 for the year before, this surplus still showing an amount above that required to pay the 5 per cent dividend of the company which calls for $125,000 per month. These figures were given to show that the company was absorbing the full operating expenses in spite of the recent wage increases.

PHILADELPHIA BUSINESS MEN MAKE PLEA ON HIGH RENTALS

At this point Charlton Ogburn, executive secretary of the commission, read a letter from the United Business Men's Association of Philadelphia which claimed to have 25,000 members, in which an appeal was made to the commission to seriously consider means of dispensing with the enormous rentals, which many companies are being forced to pay to underlying companies. The letter stated that these rentals were far in excess of any contributions by the properties of the underlying companies to the present earnings of the operating company. Of the $12,000,000 of profit earned last year, the operating company responsible for the showing received only one-sixth while the underlying companies which supplied no new rails, cars or no increased wages, received five-sixths or $10,000,000. This letter claimed that the average receipts per passenger for the last ten years had been 4.25 cents while the average operating cost had been 2.4 cents. In other words, the earnings had been enough to pay 6 per cent on the entire investment and return the entire capitalization to the owners.

It was stated that one of the underlying companies was receiving a rental equivalent to 22.9 per cent and that the original capital was repaid every two years. Another company was receiving 21.9 per cent and the original capital was repaid every two years. A third was receiving 9.5 per cent and the original capital repaid every two years. A fourth was receiving 15 per cent and the original capital repaid every three years. A fifth was receiving 6 per cent and the original capital repaid every four years. This condition had been going on for thirty-five years and was apparently to continue for 999 years less about thirty.

Mr. Ogburn announced that he had requested Stephen J. Miller of the University of Washington to make a comparative study of the operation of the Seattle street railways under private and under municipal ownership and operation. He also expected to have a report from Mr. Bell of the Department of Railways of Canada dealing with the operation of municipally-owned railways in the Dominion. The secretary also read a long telegram from W. H. Dickson, general chairman of the Tramway Adjustment Committee of Fifty-five, of Denver, which told of the work of that committee in endeavoring to find a solution for the street railway problem locally and offering to lay the complete data which it had collected before the Federal Commission. This telegram also asked that the Federal Commission hold a meeting at Denver or send a representative to assist in working out the service-at-cost ordinance which is being prepared there.

Stiles P. Jones, who testified on Thursday and presented the evidence on over-capitalization in behalf of labor, took the stand a second time to challenge the accuracy of the exhibit on this same subject which had been prepared by Mr. Welsh of the American Electric Railway Association. Mr. Warren asked permission of the commission to have Mr. Welsh file a reply to Mr. Jones' criticism, which was granted.

Marion Jackson, representing Mayor Key of Atlanta, Ga., who had been given a hearing several weeks ago, took the stand to present additional information showing the intercorporate complexities and pyramiding of holding companies. He declared that the operating companies were earning very large profits which were being covered up by the complexity of the organizations. This condition was his argument for a general program of municipal ownership.

Friday evening, Marion Jackson resumed the stand and continued his testimony regarding holding companies. On

being questioned, he stated that practically all the information which he had presented was not new but was given in financial manuals.

To answer a question from Commissioner Wehle as to what the American Electric Railway Association did to keep its members advised on developments in the art, Mr. Warren filed with the commission a complete set of Proceedings for the last convention, a copy of the Association Year Book, a copy of the Engineering Manual, and a copy of Doolittle's book, "Cost of Urban Transportation Service." Mr. Warren asked that the "Code of Principles" adopted by the association be copied into the record, inasmuch as exception to it had been taken by one of the witnesses.

Secretary Ogburn stated that he had received a considerable number of statements for filing with the commission. Among those that had submitted statements, he mentioned Stone and Webster, Corporation Counsel Burr representing Mayor Hylan of New York and the City of Camden, N. J.

The statement by Mr. Burr reviewed the conflict between the city administration and the traction companies and public service commission, as it has developed since Mr. Burr appeared before the Federal Commission. This conflict was brought about by the increases in fare granted, the abandonment of service on some lines and severing some subsidiary companies from the main operating company.

The statement by the City of Camden appears in abstract elsewhere in this issue.

Saturday's Session

Joseph B. Eastman, Interstate Commerce Commissioner and formerly a member of the Massachusetts Public Service Commission, took the stand Saturday morning and reviewed the Massachusetts situation. He pointed out that the two fundamental weaknesses in that state were the over-mileage and the consolidation of poor roads with good ones on a share for share basis.

The witness referred briefly to the results of the zone system of fare collection as it has worked out in Massachusetts and said that while he had first looked upon this as a good plan for increasing revenues, he had later revised his opinion in view of the experience. He said that the zone plans had not brought the desired revenue and the people apparently preferred a flat-fare increase. This experience had been met with both in Holyoke and Springfield. When the zone system does not produce the necessary revenue, it is necessary to either reduce the central fare area or increase the fare, either process doing away with the advantage of the 5-cent fare.

Turning his thoughts to the problem before the Federal Commission, Commissioner Eastman said that he believed the street railway problem must be solved essentially as a local one. The Federal Commission could only help by diagnosing the disease, having the advantage of a broader view of the situation unbiased by local viewpoint or prejudices.

He then endeavored to suggest a constructive outline of recommendations which it seemed to him the commission should make.

First, he would lay a good groundwork for recommendations by a statement of the present situation, pointing out that there is at present no substitute for the street railways and enlarging upon the importance of urban transportation.

Second, he would state frankly that there has been overcapitalization in the past, exorbitant rentals, mismanagement, etc. He would point out that this has been disreputable in some cases, but would show that at the same time not all companies have been guilty of these practices and others have already cleared up such faults.

Third, he would point out that a more important cause of the present dilemma is the vast increase in expenditures for wages, coal, basic materials, and all items involved in transportation work.

Fourth, he would state the absolute necessity of making larger allowances for depreciation. He was inclined to think that the adequacy of this allowance should be determined by public service commissions and that it should be required. He contended that the only way a company can be in a position to take advantage of improvements in the art is through having a depreciation fund large enough to replace the property.

Fifth, he would point out and analyze the inroads into the business which have been made by the competition of the automobile.

Sixth, he would make clear to the owners, managers, employees, and public, the great opportunities which exist for making improvements in the service. He would point out means of conserving labor by increasing the mileage per hour through skip stops, higher speed and acceleration, elimination of lay-overs, use of trailers, safety cars of proper type, and properly located and equipped power houses and shops. He would also call attention to the advantages of current-measuring devices as a means to conserve power, of fare registering devices, fare boxes, etc. He would also point out the need for enterprise in maintaining attractive equipment, in promoting courteous treatment to passengers, and doing everything possible to attract patronage. He declared that many railway men have been prone to rely too much on increased fares and neglect other means of increasing the net. He would point out to the employees the great need for co-operation and moderation and advise them that they were working for a sick industry. It was essential that the problem be worked out and this was of no greater interest to anyone than the employees. They should therefore do everything possible to attract the public and to conserve expenses by careful handling of equipment. He said he recognized the wisdom of dealing with the organizations of the men and even looked with favor upon representation of labor in the management. But he said labor should not be guilty of any hot-headed or intemperate action.

Seventh, he would point out the great danger of unregulated jitney competition.

Eighth, he would point out the necessity for a restoration of credit so that the industry may be able to attract capital necessary for those improvements already suggested. In this connection Mr. Eastman said that there were two ways of restoring credit, one by supporting and improving the credit of private corporations and the other, by relying on public credit.

Restoration of Credit of the Railways

He said that the only way that private credit can be improved is through a process which will make it possible for the corporation to market common stock. He pointed out that the Cleveland Railway was now arbitrating the matter of a 7 per cent return on its capital stock and that Dean M. E. Cooley of the University of Michigan had said that in other cities it would be necessary to guarantee 8 or 9 per cent. Even then, Mr. Eastman feared, the investors would be afraid to put their money in the street railways in view of the past history of earnings. The witness said further that the situation is complicated by the fact that increases of fares do not necessarily bring increased earnings.

The alternative, which seemed to the witness to be practically the only way of restoring credit, was public ownership. He said he was sorry that this question had been shrouded in prejudices on both sides, the one claiming that it was a panacea for all ills, while the other claimed that it

was all wrong. The question should be approached from the angle that it is an essential industry, a public function which must be performed. He thought it would be advisable to endeavor to see what the real dangers in public ownership are, and then attempt to find remedies for them, and he believed that the remedies could be found. The street railway service is so important to every element in a community that it is essential that it be operated with the greatest efficiency.

The witness appreciated that the railways must be kept out of politics and believed that this could be done, citing the public schools, fire department, and water works as examples of public ownership which on the whole have been remarkably free from political manipulation. He then turned his thoughts for a moment to various means which might be employed for carrying out these ideas, but said that the Federal Commission should naturally concern itself only with the principles, leaving the details to be worked out by the local people.

The witness said that under public ownership the railways are not entirely dependent on earnings, while under private ownership they are. He thought it was absolutely sound to make the railways pay their own way if they could, but that it might be of advantage to all to pay a part of the expense from tax levies, rather than cut service, this usually also cutting patronage. Such an arrangement might secure the best net result. This could be done under public ownership but not under private.

Questioned by one of the commissioners as to whether the Federal Commission should recommend public ownership, the witness answered that there had hardly been sufficient experience on the subject in this country to warrant such a recommendation, but that that principle might be advocated as representing the only apparent solution, and one to be looked upon as an experiment. And he believed it could be made a successful experiment. Asked about the advisability of subsidizing the railways, Mr. Eastman said that he would not recommend it, that it was a dangerous and undesirable principle. He was of the opinion that if the State lends its resources, it must have full control.

In reply to a question about the excessive rentals with which some companies are burdened, he said that this was one of the dilemmas of the situation and that it was a fault of the management of the company that such contracts had been entered into. The burden should therefore not be placed upon the public but should be borne by the stockholders. But he called attention to the fact that as soon as an effort toward adjustment by this means is made, it affects the credit of the company. This is, of course, most undesirable, but the witness said that perhaps it could not be avoided.

Milo B. Maltbie was the next witness. He took up many phases of the street railway situation and gave his opinions briefly without attempting to elaborate. He spoke of the advantage of regulation over that of operation under a contract, since the latter cannot be changed except by the mutual consent of both parties. A mistake either way may cause no end of trouble and there is no relief if the other party refuses to release the obligations. A fixed contract, he stated, which attempts to provide for changing conditions by leaving points to arbitration by three outsiders is not good and is likely to be unsuccessful.

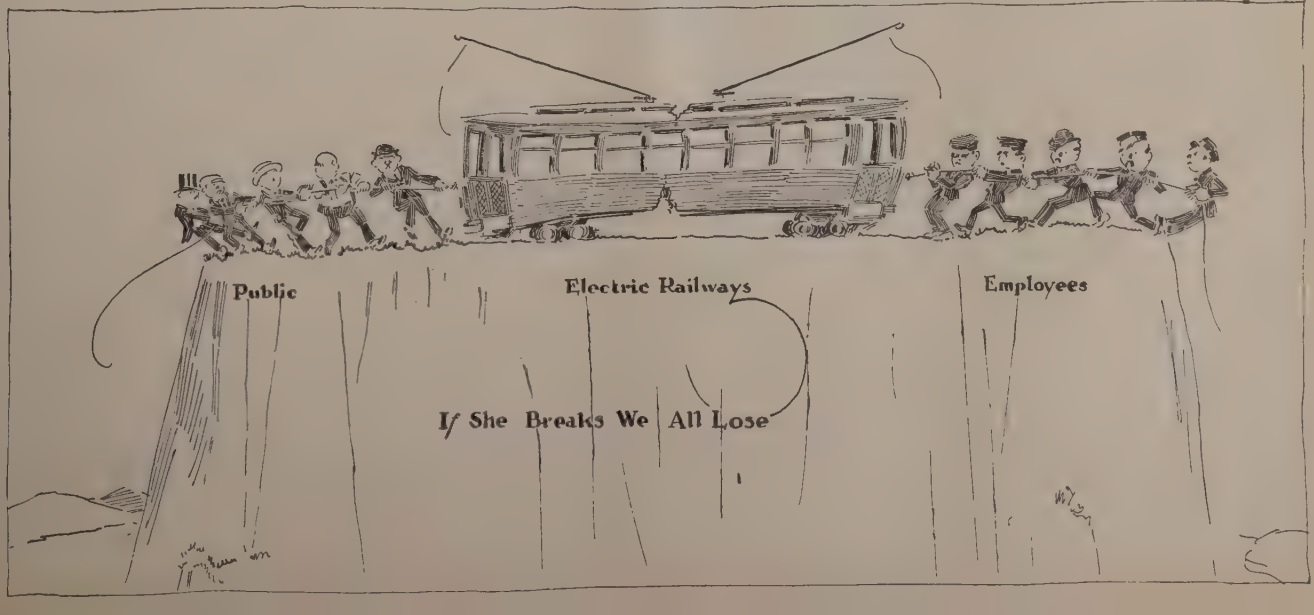
Edward W. Bemis, consulting engineer, Chicago, then took the stand and presented a perpared statement, an abstract of which appears elsewhere.

After Professor Bemis finished his testimony, C. Oscar Beasley, representing the United Business Men's Association of Philadelphia, was called to the stand. He had appeared to amplify the statement previously made by letter from the association.

Mr. Beasley spoke of the excessively large rentals being paid to the underlying companies of the Philadelphia Rapid Transit Company. Asked to outline these leases, he said:

"The most eminent attorneys of our city were employed some thirty-five years ago for the purpose of drawing these leases, and to make them applicable to any street railway. Years ago when I appeared before the Ways and Means Committee here in Washington, one of these lawyers sent down a brief that these leases were in the manner of ground rent, and that has been the theory that they have taught our street railway courts. They are contracts protected from amendment by the contract laws of our constitution. The first ray of light that we had was a decision in the United States Supreme Court in the Northern Utilities case and that said this: 'We cannot recognize the right to do manifest wrong.' That was the first break in the contract laws. This ruling also stated that no manner of contract could be used to deprive the commonwealth of its power; that no one legislature could authorize a contract that could bind another state legislature. The decision was handed down about a month ago that contracts cannot bind the commonwealth."

Secretary Ogburn presented a statement which had been forwarded by Lawson Purdy concerning the assessment of property to pay for street railway extensions. Mr. Purdy offered the view that real property should be taxed for railway extensions in proportion to the benefit derived from the presence of the railway, and that this would provide a means of gradually amortizing the railway investment so that service could ultimately be given for a rate of fare which would produce operating costs only.



Philadelphia's Answer to the Traction Question*

The Co-operative Plan Under Which the Philadelphia Rapid Transit System Operates, Has Enabled the Company to Continue Giving Service on a Five-Cent Fare—The Cure for Present Conditions in Other Cities Lies in Honest Dealing, Efficient Management and Effective Workers

BY T. E. MITTEN
President Philadelphia Rapid Transit Company

PENDING the completion of the Philadelphia story, this brief forecast of what the finished story will show is sent.

1. RESULTS SECURED UNDER CO-OPERATIVE PLAN 1911-1919

(a) Eight months report of operation, January–August, 1919, just issued, showing proportionate amount of all yearly charges and the 5 per cent dividend earned with a continued 5-cent fare; operating ratio (excluding taxes) 61.79 per cent.

(b) Eight-year report for period ending Dec. 31, 1918, showing as it does, the result of co-operative effort. Public patronage increased from 188 to over 400 rides per capita since 1910. Fares decreased from average of 4.13 cents to 3.98 cents per passenger. Car equipment modernized and service much improved. Wages increased 154 per cent from average of $622 to $1,589 per annum. Collective bargaining and co-operative welfare established with protection of $1,000 life insurance to every employee. Transformation of the inherited 1910 deficit of $318,006 into surplus of $4,482,119 in 1918; $3,597,578 in addition being meanwhile paid to P. R. T. stockholders in dividends at the rate of 5 per cent per annum commencing in 1916.

(c) Abstract from annual reports of P. R. T. covering the period from formation of the company in 1902 up to incoming of Stotesbury-Mitten management in 1911, showing the trend of events resulting in transformation of earned surplus in 1903, $405,888, to a deficit from operation of $1,222,735 for the year 1910, with accompanying exhaustion of corporate assets and impending bankruptcy. To this will be added extracts from the pamphlet describing "Proposed Loan of 1911" embracing, as it does, the several letters outlining the scope of and reason for Mr. Stotesbury's undertaking the task. It might be well to explain, that as a first bid for public support, the interest of every newspaper was at the outset secured by my personally urging the righteousness of our undertaking and the need of establishing public confidence by a frank and fair statement of every change as made and the actuating reason therefor. The flu campaign, with its aggressive publicity, and the successful fight for skip-stop continuance will be referred to as will also the "Committee of Thirteen" and their wonderful work, as showing the need of broadminded activities and also of untiring persistence in the interest of continuing economies essential to the low operating costs which made possible the basic fare of 5 cents.

2. THE CO-OPERATIVE PLAN OF 1911-1918

(a) Abstract of the printed booklet containing the Co-operative Plan, issued in 1918 following the endorsement of the War Labor Board, will review at some length the struggle of the period 1911-1918 and will describe the collective bargaining feature.

The fact that the election of employee's representatives by secret ballot in 1918 was, at the request of the War Labor Board, conducted under the personal direction of the War Labor Board's representative, is notable, as this completed the performance necessary to the unqualified indorsement evidenced by letter of the War Labor Board's chief examiner, E. B. Woods, under date of Dec. 10, 1918, stating that the plan for collective bargaining established among the workers of the Philadelphia Rapid Transit Company was not only indorsed by Mr. Taft and Mr. Walsh, but that in addition, the entire Board unanimously agreed that the general intent and spirit of its provisions were entirely in accord with the principles of the Board.

(b) The two-day picnic of the employees, Sept. 3 and 4, 1919, at Willow Grove—the 50,000 attendance, the 99½ per cent membership, the expressions of the men as contained in the talks of the employees' representatives, the speeches of Chairman Elmquist and Chairman Ainey, and my own talk at the picnic dinner will be reproduced for the information of the commission. In these troublous times, it will be difficult for the members of the commission to understand how this oasis in the desert can possibly exist and I am only sorry that the whole commission could not have been at the picnic to absorb the atmosphere of confidence and contentment which provoked the notable expression contained in Chairman Elmquist's speech, giving to co-operation an added meaning, in that to us it now also spells patriotism.

(c) The Co-operative Booklet containing the plan of August, 1911, describing the putting aside of 22 per cent of gross earnings into a wage fund, will be in evidence as will also all printed matter significant of the various moves undertaken from time to time to inspire confidence in the good intent of the management, and to show the firm stand maintained in support of the well-defined principles and established policy as set forth in the plan.

In the co-operative plan of 1918 it was made necessary to depart from the idea of participation in proceeds as contained in the co-operative plan of 1911, as a war-time expedient to bridge over a very difficult period. High wages will be continued, and in addition, the return to a plan of participation by our employees in the results of their extraordinarily effective service is now being given careful consideration.

The co-operative plan, as presented to the unions in 1911, and their signed agreement to abide by the vote and thereafter co-operate under the plan will be of interest. The troublous days of misunderstanding and misrepresentation will be reviewed from the Co-operative Bulletins 1 to 27, which carried the men and management through to the clearer understanding and complete confidence of the present day.

* Abstract of statement made before Federal Electric Railways Commission, Washington, D. C., Sept. 29, 1919.

(d) As showing progress along the way, there will be introduced an account of the hearings of the earlier Federal Industrial Relations Commission with which Mr. Walsh was so prominently identified and before which I gave evidence at the Philadelphia hearings in 1914.

(e) Dashboard and bulkhead advertising and its effect in spurring on the activities of the men have been most useful in securing co-operation as between men, management and car-rider. The letters issued in folder form to all employees under dates of May 28 and August 13, 1919, urging salesmanship and increased patronage to overcome increased cost, which received such wide publicity through the press, represent a high note in this endeavor. The bulkhead, showing that—*high fares make riders walk—low fares make walkers ride—more fares make low fares*—represents top-notch in keeping the attention of the car-rider on what we are trying to do and creating a desire on his part to co-operate in making it an accomplished fact.

3. PHILADELPHIA'S EXPERIENCE

The view of the Philadelphia situation will be considerably clarified when it is understood that Mr. Stotesbury's interest in the situation is not one of ownership, in that neither he nor I have any financial interest in the securities of the street railway company.

Mr. Stotesbury is interested in accomplishing something worth while for the city of his birth, while my own ambition in this regard is to demonstrate that there is a real and rational way by which the vexed problem may be solved.

Results here secured are thrown into bold relief by comparison with conditions existing elsewhere. P. R. T., with almost 5 per cent less employees than in 1910, is now producing over 98 per cent more effective traffic units per employee; this as against results secured on the Pennsylvania Railroad, contained in a speech by Vice-President W. W. Atterbury as reported in the public press, wherein the number of employees is said to have been increased 14 per cent, the output (or effective traffic units) being 11 per cent less than in pre-war days. The case of the Pennsylvania Railroad, showing decreased production, is but one of the many instances wherein the effort to increase production has given way to the great struggle upon the part of labor to secure a larger wage for a smaller amount of work.

Aside from the urgent necessity of helping to make up for the shortage of necessaries occasioned by the war in Europe, it stands to reason that capital and labor cannot divide that which does not exist and that more of everything essential must now be produced in order that there may be more with which to supply our needs. If the forces of labor and management will combine so effectively as to produce almost 100 per cent more per man, as we are doing here through co-operative effort, much, if not all, that is required to overcome the higher cost of living will have been accomplished.

The keystone of all success as between men and management is confidence. Distrust breeds discontent. Confidence begets confidence and co-operative effort then becomes possible. The confidence of the men in the management, and likewise the confidence of the management in the men is what makes Philadelphia stand out in accomplishment.

Philadelphia is almost alone in its position of antagonism to "cash box fare collection" or any system which tends to show a lack of confidence in the conductor. It can hardly be expected that a self-respecting employee will take seriously the statement that he is our partner if we require the action of the passenger to assure us that the fare collections are being properly made.

So much for confidence and its god-child—co-operation.

Frank statement, fair dealing, and honest purpose with patience and perseverance may be counted on in the long run to win the support of a community.

The public have for so long been befooled and bedeviled that they are now in a mood to question the demands not only of capital, but also of labor. This feeling is growing in its intensity as the citizen of inquiring mind discovers that while all about is heard the demand for a living wage, yet all evidence of merchants is to the effect that the wage-earner is now demanding the most expensive class of goods and buying with great prodigality. The owners of automobiles among the wage-earners have become legion, and it would seem that the difficulty now is as much with the higher price of gasoline as with the increased cost of our daily bread.

My own statement before the Pennsylvania Public Service Commission in the 3-cent exchange case may be taken as an example of frank statement showing the willingness of this management to jeopardize its own case rather than refrain from putting forth all of the facts necessary to the knowledge of the Public Service Commission. This statement will also be useful in setting forth our position as against city paving and other burdens of like character being placed on the back of the car-rider and reiterates our conviction that such charges should be covered by general taxation and that the car-rider should be given the fullest value for his 5-cent piece that co-operation between the public, the men and the management can be made to produce.

4. THE EXPERIENCE OF OTHER CITIES

The so-called service-at-cost plans are already proving a disappointment, for the reason that neither men nor management are paid according to the excellence of their work.

Boston is one example where expenses have mounted skyward and no fare, possible of collection, has been found sufficient to meet the added cost of production.

Cleveland has already nullified Tom Johnson's accomplishment of sweating profits from the owners and thus reducing rentals, by showing an inability to now produce its very short ride at 5 cents without charging an extra 1 cent for transfer. The city of Cleveland paves its own streets and in addition pays its street railways in money for services sometimes required to be supplied gratis by the street railways in other cities. The public of Cleveland stands for much latitude in operating methods, in order to keep the fare down, while the contest between the men and the management as to which should get added compensation first, goes merrily on—surely the answer lieth not in this direction.

5. THE FUTURE IN THE LIGHT OF PHILADELPHIA'S EXPERIENCE

Receiverships will in the near future make necessary many adjustments as between companies and communities. Readjustments should be approached in a spirit of fairness by both parties; and no advantage should be sought by communities because of the present condition of the companies in so far as it has been occasioned by the European war and the excessive costs resulting therefrom.

Valuation of properties, when resorted to as a basis of fare adjustment, should be made upon the then-cost of reproduction, together with the added cost of producing a condition of readiness to serve. I have no patience with the contention that any community may now properly expect a valuation to be based on pre-war prices or the costs of earlier years. The only justification for such a claim would lie in the supposition that, instead of enjoying increased values in common with others, the companies were to be in some way assured of a continued reasonable return upon the invested capital. Communities did not give street railway companies any such assurance. The companies took the same risks of profit and loss as did the investor in other kinds of property. Consequently in such a time of read-

justment, it seems only just that the communities should be willing to establish a fare sufficient to pay a proper return on that sum representing the amount which it would cost the city itself to reproduce the property used and usable in transporting the people.

Philadelphia's plan is not offered as a cure-all for other cities. Every situation has its own peculiar difficulties to overcome. But in the light of this experience, it is our plain duty to decry the thought that there is any cure for the present trouble excepting that which lies in honest dealing—efficient management—effective workers.

Street Railway Situation in Pittsburgh*

By E. V. Babcock
Mayor of Pittsburgh

PERHAPS the street railway passenger transportation problem in Pittsburgh is more complicated than in any other larger American city. This is brought about largely by the temporary character of the intercorporate relations and by the natural difficulties arising from the topography of the country and the great number of municipal subdivisions. Some original 208 underlying companies have been temporarily unified by leases, mergers and stock ownership arrangements resulting in three principal groups of underlying companies, two of which are operated under short-term operating agreements by the Pittsburgh Railways. These agreements may be terminated on three months' notice so that the unification is not a permanent or stable arrangement and because of various issues of underlying bonds of the original street railway companies there is always a possibility of dissolution of the three main units. This arrangement is unquestionably unsatisfactory both from the point of view of policy of development and of financial arrangements. It would seem to be a fundamental requisite in the situation that there should be a single corporation with actual ownership and control of all the physical property of the railways system. Until this is done we cannot expect to eliminate needless duplication of track or secure adequate routing arrangements in the Pittsburgh district.

That street railway companies need and are entitled to adequate revenue would seem to be a self-evident proposition. The fundamental difficulty arises in ascertaining how revenues shall be furnished. Experience has demonstrated that increases in fare do not produce equivalent increases in returns although the signs in this direction are more hopeful today than they were in Pittsburgh some months ago. There is, however, a larger problem in this situation than can be included in a mere statement of financial needs. It should be the aim of public officials to keep fares as low as may be reasonably possible in order to secure a large riding habit among the people. Transportation is not only essential for business but is a necessity for social life and all the ramifications of the activities of a great city, including amusement and recreation. It seems to be pretty definitely established that a high riding habit is a good index of the general business and social activities of the community and an indication of the general progress and spirit of the citizens thereof.

Assistance in reaching a solution can be rendered by making the whole situation known to the public and making them conscious of the part which they must play in the situation, thereby creating a public psychology which will be friendly and not detrimental to the real needs of the situation. This element would undoubtedly go a long way in increasing the riding habit and in generally supporting and helping the traction companies to answer their problems. Municipalities should also consider the possible suspension or elimination of numerous municipal charges which are really indirect taxes upon the car riders, and in the present crisis it may be advisable, at least temporarily, to relieve the car riders of these forms of indirect taxes.

So far as reasonably possible, definite assurance should be given of a fair return on the capital actually and fairly invested in the property so that new capital may be invited and may understand that it will be fairly treated. Street railways, like all other living and growing enterprises, have a constantly increasing need for more money. They must, therefore, always be in a position to attract new capital to meet the growing necessities of the business, both from the point of view of necessary extensions and from the point of view of keeping the property apace with the development of the mechanical arts. The public will thereby benefit by a lower rate of interest both in return on the existing investment and on future investments if capital is given reasonable assurance of definite returns.

Cities not only compete with other industries for capital in these matters, but they compete with each other, and naturally those cities that give assurance of fair treatment and reasonable return, will have the first call on the monies which may be available for street railway purposes.

Fundamentals in the Problem

There is no panacea for the transportation ills of the present day. Regulation by public service commissions, service at cost plans, or municipal ownership will not usher in the day of the millenium in this respect. The transportation problem will always be one of the great, if not the greatest, problems of our municipal life and must be handled in the same manner that all other great industrial and commercial enterprises have been worked out in the past. It is obvious that State public service commissions, while satisfactory for other forms of public utilities, can never completely solve the large local problems of transportation in our great cities. Transportation uses the local highways and must necessarily conform to all local developments. It is brought into daily touch with the life of the city in such a way that there must be the closest harmony and co-operation between the local street railway company and the municipal authorities. This inevitably points to some operating arrangement whereby the local municipal authorities shall be placed in a position to exercise a large amount of control, giving the city government a voice as to proper standards for transportation service and operating conditions.

The use of the service at cost plan, which is now strenuously proposed in behalf of the street railway companies, has many elements to commend it to favorable consideration. It, however, possesses one element which may prove that it is not the final solution to the difficulties, namely, that it robs the operating company of the incentive to secure the best operating economies and keep down the cost of the service. Yet it may be that no better plan can be evolved to carry the business across from the unregulated age to the present regulated age than that of "service at cost" with arrangements providing for possible municipal ownership under reasonable conditions of purchase. If a service-at-cost plan could be developed whereby good management could be fairly rewarded, then no serious objection could be raised to the plan.

Theoretically it seems that the best possible arrangement to meet the situation would be to have municipal ownership with private operation. I have said, theoretically, because of numerous practical difficulties which present themselves

* Abstract of statement made before Federal Electric Railways Commission, Washington, D. C., Oct. 2, 1919.

in such a program. It may be plainly demonstrated, however, that such a plan, if definitely stabilized and assured, has very great advantages over any other arrangement and eliminate all of the controversial atmosphere which now exists between private capital and the public. It would permit of financing on much lower interest rates than financing by private interests. It would give the municipality complete control of its own development and place in its hands the key to its own destiny. Coupled with private operation it would produce all of the advantages of private, as contrasted with municipal or public, operation with its associated political entanglements; and if combined with a plan whereby, at fixed periods, say every ten years, the operation of the system was let to the best bidder, it would insure good service at reasonable cost.

Under such a plan and with proper municipal control established, standards of service would be possible and we would still have incentives for effective and economical operation, and good management would have its opportunity to be adequately rewarded. This plan may be criticised as being Utopian, yet at the same time it does not rob the enterprise of incentives for good business management which are likely to be found in a service-at-cost plan or in a municipally operated system.

Speaking for the great industrial district of Pittsburgh I can assure the commission that we are giving careful consideration to the problem which is presented there. We have gone into this matter thoroughly and, at a considerable expense, have presented to the Public Service Commission evidence relating to all matters affecting the fair value of the property and all questions relating to routing, transfers and service generally. We hope, within a short period, to receive a decision from the commission as to the fair value of the properties.

I feel sure that the people of the Pittsburgh district will be willing to pay a fair price for adequate street railway transportation when the matter has been fully presented to them and the ghosts of watered stock and of high finance of past days have been laid. The essential problem is one of public education and of establishing the business upon sound and just financial values with complete harmony between the municipal and company representatives, and the right, in the city, to control its streets and its own development.

Possible Operating Economies and Sales Methods*

The Positive Things in Reducing Costs and Increasing Income That Electric Railways Have Done or Can Do—A Zone-Fare System Is the Logical Means for Securing Even Distribution of Cost for the Service Rendered

BY WALTER JACKSON
Brooklyn, N. Y.

NOT all of the men of the electric railway industry hold the belief that the only way out is in higher fares which lead to diminished utility; or failing to secure enough increase in revenue from greater fares, the direct subsidization of a private industry from public funds. The optimists are agreed that the industry will be able to take care of itself so long as it is granted reasonable relief from unfair burdens and so long as it is granted temporary financial aid upon proof that it is prepared to avail itself of all the technical resources of the art in the manufacture and sale of electric railway transportation. Granted such aid they are confident that they can induce the public to pay whatever the transportation is worth in both quality and quantity without crippling their initiative by guaranteed rates of return equal to or little better than bank interest.

Perhaps, the larger difficulty in which the electric railway industry finds itself is not that of adjusting the selling price to the enhanced cost of the product but that of adjusting itself from the monopolistic to the competitive viewpoint. Since it has had to compete with transportation purveyors who deliberately ignore the long rider, the electric railway realizes that the flat fare of any denomination places it under a terrible handicap. Furthermore, it is learning that the self-propelled vehicle has created an appetite for more and faster transportation. The people who have become acquainted with something quicker than the old-time street car will never permit the gasoline vehicle to be driven off of the streets no matter how unfairly it competes with the street railway. Therefore, the street railway must incorporate this service as a part of its system of popular or mass transportation and it must be prepared to sell each kind of transportation at the appropriate prices.

Although the electric railway can carry most of the people most of the time for the lowest rate of fare, it does not follow that all electric railways are now using the tools that will enable them to do so. What, then, are those tools and to what extent have they been applied?

POWER SAVING EASILY POSSIBLE

It will be simpler to discuss the technical resources of the art first and the selling resources second. Of the technical resources, the item which is naturally in the foreground is the production and use of power. No noteworthy improvements are obvious in generation and distribution except the automatic substation which is an invention of but two years application. But the greatest source of waste is not in the making and distribution of power but in its use on the car. The only way to curb this waste is to use some form of car checking instrument, and such instruments are all purchasable practically upon the basis of payment out of savings. However, only about 20 per cent of the cars in the United States are now equipped with such devices.

THE SAFETY CAR OF GREAT IMPORTANCE

Far and above the savings possible from power economies are the extraordinary results already secured from the automatizing of cars whereby one man can handle a modernized car to better advantage than two men can handle an old-style car. Indeed, the light-weight safety car also has a favorable influence in the further reduction of power costs; but for the present we will consider the subject from the dominant feature of platform expense. It is in this item that an enormous reduction is possible if we apply to the electric car the same principles that are applied to a machine tool, namely, the use of automatic and speed-up appliances to increase output and decrease human attendance. The merits of either new or rehabilitated cars with automatic equipment seem so obvious now that it is hard to see why not more than 5 per cent of our cars are so equipped, al-

* Abstract of statement made before Federal Electric Railways Commission, Washington, D. C., Sept. 29, 1919.

though the laborless car has been before the industry for more than three years. It is pleasant to record just the same that this car has already established itself in almost every kind of street railway service from 10,000 population to several million. The case of Terre Haute, Ind., is of special interest because it will be the first city of 75,000 to be operated completely with one-man safety cars. The figures submitted were furnished through the kindness of E. M. Walker, general manager Terre Haute, Indianapolis & Eastern Traction Company.

What the Safety Car Has Done for Terre Haute

Terre Haute is an excellent object lesson, for it is not even a good street railway town according to American city standards. Its passengers per car-mile have been little more than four at any time, so that the earnings under the average fare of 4½ cents were but 21.9 cents per car-mile during 1918 and under the straight 5-cent fare of 1919 but 21.95 cents on the older cars and 20.62 cents on the smaller safety cars. A railway which announces its intention to continue on the 5-cent fare despite the comparatively sparse traffic must have done some things worth quoting. It has. On Dec. 1, 1918, the company began the installation of safety cars. At this writing, thirty-one safety cars are on hand of which number twenty-five are in daily use. So popular and economical have these cars proved in comparison with their predecessors and those still left that the company has recently placed an order for twenty-five more to permit all the service in Terre Haute to be safety car service. The most significant feature about this second order is that the money for the cars is being loaned by bankers in Terre Haute and the neighboring city of Indianapolis. This fact surely speaks for itself.

In introducing the new operation, the company substituted six and seven-minute intervals between cars for ten-minute intervals. The improvement in service was made even more marked by an increase in the schedule speed of cars from 8 and 9 m.p.h. to 10 and 11 m.p.h.

The effect of this better service is shown by the reduction of jitneys from twenty-five to a mere five or six, and it is doubtful if any jitneys will be left after all the cars are of the new type. Still more obvious is the great increase in riding—the surest sign of public approbation. During the period Jan. 1-Aug. 31, 1919, the safety cars of Terre Haute were responsible for 53 per cent of the mileage run. In that period the safety car lines had an increase in traffic of 43 per cent, which closely paralleled the increase in service offered to the public. It will be shown later that it would have been financially impossible to have offered this increase in service with the older cars operated with two men and no automatic and up-to-date safety appliances.

Safety Car Operation Effects Notable Increases in 1918 Over Previous Banner Year

The traffic statistics of Terre Haute show that the banner year of the past was 1913 when the gross earnings from passenger transportation were $435,000. In 1918, with but 4 per cent of the mileage made by safety cars, the approximate gross was only $367,222 on the basis of 4½ cents per passenger. In 1919, however, the estimated gross will be $490,000 to $500,000. In 1913, Terre Haute's population was 66,000 and its average riding index, or rides per inhabitant per annum on the basis of a 4½-cent fare, 148. In the meantime, the number of licensed auto vehicles has gone to 3600 or fivefold and the riding index has gradually decreased. A 53 per cent application of modernized car medicine has already brought the riding index up to 133, and there is no doubt that a 100 per cent application in 1920 will bring it beyond the palmiest days that Terre Haute ever had. Curiously enough, the actual revenue per inhabitant per annum was $6.66 both in 1913 and 1918, the fare being 4½ cents in 1913, and 5 cents in 1918 through the abolition of six-for-25 cent tickets, etc. In 1917 the Terre Haute lines carried 8,366,452 revenue passengers, and in 1918 but 8,160,492 revenue passengers at the same average fare of 4½ cents. The up-to-date operation has definitely stopped that tendency downward. So much, then, for the fear that the electric railway is on the way to Dodo Land.

As the best index to popular approval of the service is the increased riding, it may be of some interest to add that Terre Haute is a strong labor town with two newspapers definitely representing labor interests; also that the cars when first put on the street met with some ridicule and to this day are referred to as "Green Bugs." Nevertheless, they made their way.

These cars have certainly justified their name of safety cars. For the first eight months of 1919, their average accident cost per 1000 car-miles run was $386 compared with $1,351 by the older cars on the basis of 865,000 safety car-miles run. The average cost per safety car accident, including repairs, was $16.72 compared with $65.78 by older cars. Mr. Walker estimates that the saving in accidents alone is equivalent to a return of 5.9 per cent on the investment. Further experience should produce still better records as the operators and the public become better acquainted with the speedier acceleration of these cars. Up to Sept. 16, 1919, Terre Haute's safety cars made 1,000,000 miles without serious trouble with either the electrical or air equipment.

Safety Cars Are Popular With the Employees

No difficulty has been found in training men for this service. The first operator was a man who has been at the front end as motorman for thirty-two years. The second oldest man gave up the safety car temporarily saying it was a bit too fast for him, but he soon asked to be restored. Safety car runs are now coveted by the men. Platform wages in Terre Haute are 39 cents to 42 cents an hour with 5 cents an hour additional for safety car operators. Of course, other railways are paying higher wages than these, but it must not be forgotten that the gross earnings per car-mile in Terre Haute are also very low.

In addition to the reduction of platform expense and augmentation of revenue, these cars are also very economical in the use of power. A test recently conducted by students of Rose Polytechnic Institute showed only 1.1 kw.-hr. per car-mile covering traction, light, heat and energy for all the air-operated devices. This is easily one-half to one-third of the energy requirements of big cars used throughout the United States, although the old cars of Terre Haute are not exceptionally heavy. With such low energy consumption and the advantage of a moderate-sized car, it is unnecessary to try such unsatisfactory (to the public) expedients as the skip stop.

Summarizing the costs, Mr. Walker finds the following, covering the first six months of 1919:

Safety cars earned 20.62 cents per car-mile and cost 11.25 cents per car-mile, leaving 9.37 cents per car-mile available for taxes, fixed charges, rentals, dividends, etc.

Ordinary cars earned 21.95 cents per car-mile and cost 19.84 cents per car-mile, leaving 2.11 cents for taxes, fixed charges, rentals, dividends, etc.

The charges against safety car operation include the wages of eight crossing flagmen.

The operating ratios, excluding taxes, of the two types of cars compare as follows:

	Safety Cars	Others Cars
January	61.85 per cent	94.66 per cent
February	58.17 per cent	89.82 per cent
March	54.16 per cent	93.09 per cent
April	53.05 per cent	86.56 per cent
May	49.39 per cent	77.74 per cent
June	51.76 per cent	102.23 per cent

The safety car ratios are reminiscent of the good old days; the other ratios spell bankruptcy.

In conclusion, it may be worth while to show just what the change in operation and equipment standards promises to do for Terre Haute based upon the costs of 1919 and 1918.

In 1918, Terre Haute ran 1,802,527 car-miles, and as but 4 per cent were safety car-miles, it is fair to assume that the cost per car-mile should be that then pertaining to the old cars or 17 cents. This would give a cost of $306,429 against an income of $394,824 (21.9 cents per car-mile) leaving available for taxes, fixed charges, rentals, dividends, the sum of $88,395.

Had the same cars exclusively been operated during 1919 with an increase of 10 per cent in mileage at the actual cost of operating such cars during the first six months of 1919 and with the revenue of 21.95 cents per car-mile actually obtained during that period, we would have 1,982,780 car-miles earning 21.95 cents and costing 19.84 cents per car-mile. This would give an income of $435,220 and an outgo of $393,383, leaving available for taxes, fixed charges, rentals, dividends, only $41,837.

Had safety cars exclusively been operated during 1919 with an increase of 33⅓ per cent in mileage at the actual cost (11.25 cents) of operating such cars during the first six months of 1919 and with the revenue (20.62 cents) actually obtained with safety cars during that period, we would have 2,393,360 car-miles costing $269,253 and with an income of $493,510, leaving available for taxes, fixed charges, rentals and dividends $224,257.

As the older cars would have left only $41,837 for the same purposes, the difference between 100 per cent old-style and 100 per cent new-style car operation in 1919 would be $182,420—a sum that would keep a company of this size on a thoroughly sound basis.

WHY HASN'T THE SAFETY CAR BEEN ADOPTED MORE RAPIDLY?

One may well ask in view of the foregoing why the safety car or automatized car operation in general has not been adopted more quickly. Those who have been tardy have offered three reasons, to wit: The objection of the public, the objection of the platform worker and the difficulty of getting new money. These may be dealt with in order.

The objection of the public almost invariably has arisen in those cases where the railway made no noticeable improvement in the equipment of the car or in the headway between cars. On the contrary, such half-hearted and mistaken attempts at one-man car operation were often accompanied by an increase in fare! The scores of safety or automatic car installations now in service surely prove beyond further argument that the public welcomes modern one-man car operation when it is accompanied by better service.

So, too, the platform man has objected very properly to that kind of one-man car operation which simply doubled his labor, causing him to run at a lower rate of speed and yet increasing the hazard of accident. Sometimes, the platform man has objected to actual automatic cars on the ground that they would lose their jobs. It is obvious, so far as this objection is concerned, that electric railways are not run primarily to keep the maximum number of men in employment any more than a shoe factory would refrain from using automatic machinery for the same reason. This fear of losing jobs is not justified by practical results. Continued two-man car operation would deprive all men of their jobs eventually on most of our railways. On the other hand, one-man car operation not only permits the continuous existence of the electric railway but also permits the operation of more service with more cars. The usual situation is that the ordinary rate of turnover on an electric railway is so fast that it outstrips the introduction of the safety car, with the net result of stopping both hiring and firing. At the same time the men that are employed on these cars can be paid a higher wage, while future employees can be engaged with an eye to their ability as salesmen rather than their ability to stop a 35,000-lb. car by brute strength. The conditions of automatic car operation are so much more agreeable than the old-style car that in future we may expect a much slower rate of turnover than in the past. The car platform will then be no longer the last resource of the man looking for a job.

AT SMALL COST, EXISTING CARS COULD BE CONVERTED TO ONE-MAN TYPE

The objection of the railway that it has no money for either rehabilitated or new automatized cars is frequently a valid one, but it does not offer an insuperable obstacle. The losses due to competition would have bought a great many new cars if the persistence of such competition had been realized in time and met by increased service. However, in most cases it is not essential to have new cars although the latter are more economical to run and better traffic magnets. For $400-$500 to $750 it is possible to automatize any car, the lower figure applying to a single-end car already equipped with air brakes. With such equipment a saving of $8 a day can be secured if we assume a sixteen-hour day and 50 cents an hour pay for the superseded second man of each shift. At least 75 per cent of the existing cars could be converted to one-man, laborless car operation in this manner.

So striking have been the savings of these light-weight one-man cars that arrangements have been made to sell them on the car equipment trust plan; but as already indicated in the case of Terre Haute, one home demonstration is sufficient to insure the raising of money for more cars at home. Indeed there is practically no risk in loaning money for safety car installations because the equipment is standard and can be used elsewhere should the first buyer fail to make good.

Hitherto we have considered only the reduction in operating costs afforded by one-man car operation of the right kind. It is in order now to show why it also increases the gross earnings. With the coming of the private auto and the jitney in large numbers, electric railways began to realize that the big-car, long-headway system had failed to secure anything like saturation of traffic. Thus came the thirty-two to thirty-five seat short-headway, one-man car in place of the fifty-seat two-man car. These cars did more than drive out the jitney; they created as well as recaptured traffic. Their work was a hint that no one can foresee just how much riding the public will do until a trial is made. In many cities the increase in patronage has run almost neck and neck with the increase in service offered.

ZONE FARES TO INCREASE PATRONAGE

Frequent service with one-man light-weight cars is by all odds the surest road to decreased costs and increased revenue. There is, however, a second way of more limited application and that is the sale of transportation according to quantity—in other words, the zone system.

So long as the 5-cent fare met the desires of the electric railway operator, little thought was given to the distinction between long and short riders, compulsory riders or voluntary riders and the proportions of each. The same people who received more than their money's worth were also expected to pay for less than their money's worth. They didn't, of course. With the coming of increased flat fares the distinction between the two kinds of riders, or rather the discrimination against the short rider, became aggravated. The losses in traffic showed that even under

the 5-cent flat fare there were 10 to 20 per cent of highly profitable riders who did not have to use the street railway. That it might be worth while to retain the 5-cent rate for these riders occurred to a few operators who installed the central area system for lack of acquaintance with true zone systems. The central area system retained the 5-cent riders of the central business district but did not recapture the short riders in other districts.

Realizing that the need for more data on zone systems would soon arise I made a detailed study of fare collection practices on the ground in Great Britain and Ireland. Later I supplemented these personal studies by analyses of zone fare operation in Australia and New Zealand where the conditions of living are declared to be equal to or better than in the United States. The first thing gathered from these studies was that the true zone fare inevitably brings out a large proportion of people who ride 1 mile or less, and this has been found to apply under a great variety of topographical, density and other conditions. This indicates clearly that the minimum fare must be one that will attract the walker. In Great Britain this minimum fare is usually 1 penny; in Australia with conditions closer to our own, it is more likely to be 1½ pence or 3 cents for an initial zone up to 1½ miles or so.

If any American city of reasonably compact population can show only 10 to 20 per cent of its riders within a 1-mile ride, it is obvious that it could do something with a lower fare for the shorter distance. It would be unwise to specify any particular scale of fares for universal application. In many towns, there might be but few situations where the additional revenue from a differential fare system would make the extra cost and complication worth while. It would always be desirable first to exhaust the technical resources of the art.

Again, there is little or no connection between the zone fare and congestion. Zone fares are found abroad in almost every kind of community. The character of housing often appears to be a national characteristic, as the tenements of French cities and the individual homes of English cities indicate. Furthermore, the expansion of American cities has been promoted largely by the ease of securing land, there being no century-old estates to interfere. Where a city has had a zone fare from the beginning, it must be obvious that the higher fare on the outskirts is offset in some measure by the lower cost of land. In the United States, contrariwise, the realty man has fattened upon the expansion of the electric railways. In any event, under a correct zone system the fare is not absolutely cumulative, so that the further a man lives away from the center, the less his fare per mile.

The only serious thing we have to consider is that in changing from a flat to a zone system we necessarily upset the values of a generation. Hence it is wise to make the changes in fare as reasonable as the conditions permit, but it would not be wise to refrain from increasing fares merely because such increase would deprive realty owners of unearned increment unless the community itself is prepared to make up the electric railway deficits.

The third thing gathered from a study of the zone fare in practice is the uselessness of comparing track mileage to population for the purpose of comparing the zone fare versus the universal fare. The old European cities show a comparatively small amount of track to population whether they have flat fares or zone fares. The new American cities and new Australian cities show liberal trackage, although the Americans have flat fares and the Australians have zone fares. A reduction in track mileage would be a healthful blood-letting for many American cities. While British cities have so little track in proportion to population, it does not appear that their operators feel the need for much more. The tendency is to serve the suburbs first with buses or trackless trolleys and to refrain from putting down costly track until the population is dense enough to pay for say a ten-minute headway. This is common sense.

A fourth point gathered from a close study of British practice is that the success of the zone fare depends as much upon close headways as upon a short fare for a short ride. It is obvious that people will not wait ten to fifteen minutes in order to ride ¼ to 1 mile. In Glasgow, where the minimum fare zone is 1.16 miles, fully 63 per cent of the passengers rode within that distance last year, and it must be clear that they would not have done so much short riding if the car service had been infrequent. It does not follow, of course, that the cars themselves are as good as our own in comfort and general furnishing. Generally, they are not, although the provision of cross-seats on the upper decks and permission to smoke there are much appreciated. Jitney experience in this country indicates that people tend to take the first vehicle that offers—a run-down auto being often preferred to a finely-upholstered car because the jitney is there and the car isn't.

The fifth thing gathered from a study of zone fare systems is that they are not to be judged in connection with the wages paid to the carmen unless we were to use the same scale of fares. As a matter of fact, the British carman today is earning pre-war American wages, has an eight-hour day and gets certain privileges like uniforms, payment for reporting time, and vacations that make the platform cost just as dominant as here. On this new basis the fares are still 1 penny or 2 cents minimum. On the other hand, the zone fare in Australia has been applied for years on railways which were paying American wages. No matter what the wages are, a zone system can be worked out on the plan of maximum revenue from maximum riders as against the plan of 8, 9 and 10-cent fares for all who can be compelled to pay them.

The Zone System in America

Until the Public Service Railway of New Jersey installed its zone system beginning Sept. 14, 1919, the United States did not have a single example of an electric railway in which an effort is made to get the same high proportion of less-than-a-mile riders found wherever the zone system has been in use for a number of years. A discussion of the Public Service case may serve to illustrate the traffic-building possibilities of the zone fare as applied to America.

Early in March, 1919, the Public Service Railway at the request of the New Jersey Board of Public Utility Commissioners presented a proposal for a zone system of fares in which 5 cents was established as the fare for the first mile and 1 cent for every mile thereafter. Transfers of the usual time-limit type were to be charged for at the rate of 2 cents for the first mile on the connecting line and 1 cent a mile thereafter.

At the hearings conducted on this proposal before the board, the representatives of the League of Municipalities laid stress on two things: That a zone-fare scheme ought to be one that would recover the enormous losses of traffic to the jitney and motor-bus and that would include a fare low enough to transform walkers to riders. As much as possible of the additional revenue ought to come out of increased patronage instead of being drawn wholly out of the passengers compelled to use the service. Accordingly, the writer suggested a fare of 3 cents for the first mile and 2 cents for each increment of a mile or more thereafter. To shade the fare for the long rider, he suggested in place of a strictly cumulative fare one in which the first additional zone would be say 1 mile, the second say 1⅛, the third say 1¼ miles and so on. This would not always be practicable because of encroachments upon a series of zones emanating from a neighboring city but indicates the general principle of showing some consideration to the long rider whose fare is so severely increased at best. Electric

railways of street railway character ought not to encourage extra long-haul traffic when the faster service of a steam railroad or electric interurban is available. This is peculiarly the case on the Public Service Railway which had been giving some extraordinarily long rides for 5 and 10 cents, so that the change from a flat to a zone system of any kind meant a great increase in fare for people who had no regard for the value of their time. I believe that it is far better for an electric railway to lose the small percentage of such long-distance riders than to lose or fail to attract the enormously greater number of short-distance riders for whom the street railway was created.

The decision handed down by the Board of Public Utility Commissioners covering a 3-cent fare for the first mile and 2 cents a mile thereafter followed a statement by President McCarter of the Public Service Railway in which he declared that a flat fare of 9 cents was one of the alternatives but that he could not favor such a fare because it would still further impair the usefulness of the street railway to the public and that he accepted the 3-cent minimum fare with 2-cent zones.

The introduction of the zone system on the Public Service Railway has not been without its difficulties, but it must be borne in mind that the system of fare collection has been radically altered at the same time and that neither the platform men nor the patrons could be expected to handle it smoothly within a few weeks. The Public Service zone system being operated on the pay-leave plan also loses one of the great advantages that a differential fare possesses on foreign systems, namely, in securing the selfish interest of the passenger in the transaction. On all other zone systems the passenger pays before he gets most of his ride, and he has a selfish interest in seeing that he pays only for what he gets. The regular passenger especially cannot be said to care greatly what the conductor does with his money if he pays upon leaving the car. In any event, no zone system can be as convenient as a one-fare system, but that it can handle extremely heavy traffic is evident from the fact that the average number of fare collections in British cities is fourteen to twenty per mile compared with less than half that number here.

To conclude as to the zone system: A zone-fare street railway with a combination of good-will, low base fares and short headways will get the minimum revenue from a maximum number of patrons and leave little or nothing for the jitney.

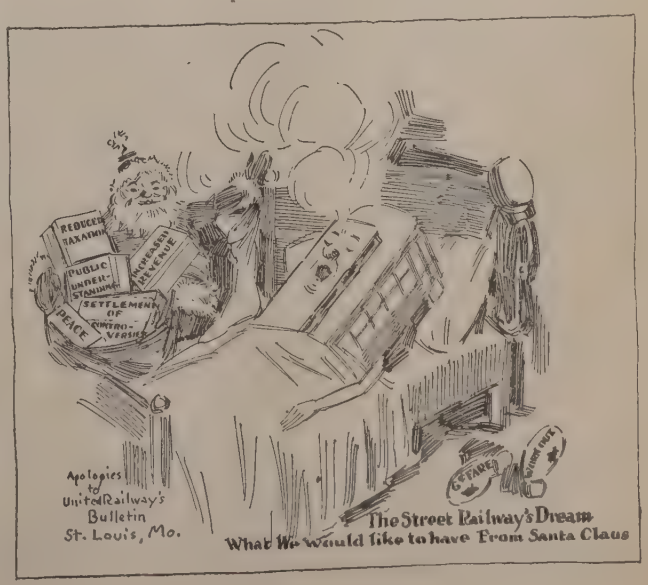
It is natural to ask how one-man car operation and the zone fare can go together. Obviously, we cannot expect one man to handle four or five different kinds of fare in addition to running the car. The way to avoid this will be through the operation of one-zone and two-zone cars with one man, reserving the larger cars for long through runs in multi-zone service. There is no good reason why the service as well as the fares should not be zoned in accordance with the density of traffic. The same route could have through cars with two men each going from one extreme terminal to another, while one-man cars should shuttle back and forth over 1, 2 or 3-mile sections between. On many a two-zone run there could be one collection on entering through a prepayment area and a second collection on leaving the car in the second zone. I have in mind some of our large systems where the present method of operation calls for long through routes with large two-man cars at a sacrifice of local traffic opportunities in the towns through which these cars pass. Such local traffic can be developed only with small, one-man cars operated in town at frequent intervals.

For short-route towns it is not practicable to use a zone or multiple fare system. It is possible, however, to work out various forms of commutation tickets based upon giving a reduced rate to those who average more than two rides a day. In its practical working out, such a ticket or pass gives a fair deal to both the long rider and the short rider, since the short rider has more opportunities to ride, as in going home for lunch where the long rider would lack the time. Such a ticket would be far more convenient to passenger and car operator as it avoids all need for making change, issuing transfers and arguing about the time limits and use of the latter. It would be hoped that such a pass would go a long way toward encouraging off-peak riding and build up the habit of riding short distances. The latter characteristic is already noticeable in bad weather.

It is time for the electric railways of the United States to take a hint from British practice and make more use of the motor bus in handling extensions and giving a *de luxe* service on good shopping and other show streets at a special rate of fare. The greater flexibility and all-around usefulness of the motor bus cannot and should not be ignored by the street railway operator just because it happened to be used by a private competitor first. Because of its experience in routing, scheduling and other transportation technique, the electric railway is the logical operator of bus service. All popular price transportation should be under one head.

I have been asked to offer an opinion as to the relative merits of British and American street railways. The most direct and shortest statement would be to say that America excels in mechanical and electrical equipment standards except in track maintenance and that the British excel in the selling of transportation. The latter, it seems to me, is logical because of the use of a system of fares which compels the growth of a more business-like attitude than where you sell all classes of customers at one price.

I do not find any essential difference in the operating standards of British tramways because of private or public ownership. Most of the larger properties are publicly owned. They are certainly conducted in a most efficient manner, and rather than classing them as extravagant I should say that the tendency is toward parsimony. The middle-class councilmen always want fares that will bring a large surplus for reduction of taxes, while the labor party councilmen strive for low fares regardless of profit. Neither the private nor public railways are in the precarious condition of the American electric railway because they have had more success in raising fares without diminishing traffic, but the increases in operating costs and materials have been even greater than here so that it is only a question of time before the British railways will have to hitch up their fares another notch despite the fact that they are not embarrassed by an adverse public sentiment, a multiplicity of subsidiary corporations and the like.



What Ails the Street Cars?*

A Review of the Causes for the Present Condition and Some of the Available Remedies — Good Transportation Is Not Only Desirable but Is Indispensable to Community Development

BY JOHN A. BEELER
Consulting Engineer, New York

THE crisis which we are considering today is almost unprecedented in the history of industry. A super-essential business—the electric railway—is literally begging for the right to live. From the popular notion of it as an investor's paradise, where every dollar planted was expected to bring two, it has turned into a slough of despond that is engulfing stocks, notes and bonds with terrifying impartiality. The immediate reason is apparent. The margin between income and outgo has been wiped out by the rise in costs of materials, labor, taxes, and interest. The underlying causes are much more difficult to determine, and having been found the proper remedies must still be applied.

The industry got started wrong. Thirty years ago the street railway man thought he had discovered a bonanza when he replaced the horse that wore out in four to six years with a motor that was supposed to last forever. Electric motors of 10 hp. were attached to the cars overnight and the horses led out to pasture. But the early motors did not last as long as the horse, and 20, 30, 40, and 50-hp. motors followed in rapid succession. Many of these changes were capitalized in the hope that the last one would be final and that perfection had at last been attained. Experience, however, showed that tracks and things generally wore out even more rapidly than before. Light cars passed out with the horse, and mania for weight ran riot. A limit to the length of ride which was to be given for one fare was scarcely thought of. The amount of taxation that the electric railway was supposed to be able to stand was almost unlimited.

Present Conditions Described

The situation on the average street railway in the United States today is about as follows: the earnings are 40 cents per car-mile, or $3.36 per car-hour, the speed being 8.4 m. p. h. The trainmen's wages average 55 cents per hour. The operating ratio is 75 per cent, and $4 is invested for each dollar's worth of business done. On most of the systems insufficient provision or none at all is made for replacements to plant and equipment due to obsolescence or made necessary by the progress of the art, it being held that current repairs are all that are required to keep the property in a perpetual 100 per cent operating condition. This is one reason that operating costs are so high today. The junk that is in operation in many of our cities ought to be in a museum for antiquities. No wonder there are sixty automobiles for every street car and that millions ride in jitneys.

The condensed operating statement of a company doing annually a million dollar business under the average conditions cited above, with an allowance of 3 per cent on two-thirds of the investment to cover depreciation or replacement charges that cannot be covered by ordinary repairs, and interest at 6 per cent on the investment, is as shown in the following table:

Gross income		$1,000,000
Operating expenses		750,000
Earnings from operation		$250,000
Deductions:		
Taxes	$50,000	
Replacement fund	80,000	
Interest 6 per cent on $4,000,000	240,000	370,000
Deficit		$120,000

There are but two ways of overcoming the deficit: to increase the receipts and to reduce the expenditures. The most alluring method is to raise the flat fare to 6, 7, 8, or 10 cents, with or without a transfer charge. This procedure often proves like chasing the pot of gold at the end of the rainbow.

Taxation

The subject of taxation presents a field where the authorities can relieve the situation materially. There seems to be no good reason why a railway should pay more or less than does any other business on its physical property. Special franchise or license taxes should be done away with, as in many cases today the franchise is a liability and not an asset. Paving taxes should be abrogated generally. Then the average rate of taxation would fall from 5 per cent of the gross income to about 2 per cent, reducing the expenditures of a million-dollar company by $30,000. To make both ends meet, this company would have to save the remaining $90,000 of its deficit from operating cost. The condensed statement would then be as follows:

Gross income		$1,000,000
Operating expenses		660,000
Earnings from operation		$340,000
Deductions:		
Taxes	$20,000	
Replacements	80,000	
Interest 6 per cent on $4,000,000	240,000	340,000
Surplus		$000,000

The question of operating economies thus becomes paramount. They are many, and most of them can be applied to every company, regardless of the fetish of local conditions.

Schedules, Lay-Overs and Routing

The most important items in any company's operations are: (1) frequency, (2) regularity, and (3) speed. With these items right, almost any company will succeed.

The importance and advantages of higher schedule speeds for electric railways has been set forth fully in an article by the writer in the issue of the ELECTRIC RAILWAY JOURNAL for Sept. 27, 1919.

The elimination of excessive lay-overs is most important. The ratio of lay-over time to actual running time varies from 2 to 25 per cent. Long lay-overs are given frequently as a concession to labor when if the nature of the resultant trouble were fully understood labor would not want them. As an example, apply the extremes to two systems, each earning 40 cents per car-mile and making a running speed not including lay-overs of 9.33 m. p. h. The line with the 2 per cent lay-over will earn $3.67 per car-hour while that with the 25 per cent lay-over will bring in but $2.79. After

* Abstract of statement made before Federal Electric Railways Commission, Washington, D. C., Sept. 30, 1919.

paying the trainmen at the rate of $1.10 per car-hour there remain respectively $2.57 and $1.69.

Many cities today maintain routes and service designed for traffic conditions of a generation ago. Rerouting coming under my observation has worked wonders in bettering service for the public and saving money for the company. Short-lining and turn-back service will frequently enable a company to accommodate twice as many people during the rush as where all cars are run through irrespective of the length of line.

Some non-essential non-paying lines may be abandoned profitably. Frequently, however, such lines can be made to carry their operating expenses when run as shuttle lines or with one-man cars. After a line has been built and equipped it should not be abandoned except when it is impossible to earn operating expenses alone, as the interest on the investment will be lost in abandonment anyway.

OBSOLETE EQUIPMENT IS WASTEFUL

Because adequate allowances for replacement were not provided from earnings, many electric railways operate today with dingy, dilapidated equipment that actually repels customers. These cars are usually much heavier than necessary. They pound the track and paving to pieces, while their excessive demands for power eat up the coal pile. In operating such cars an indifferent motorman can waste readily several dollars a day for power alone. Yet only 5 per cent or less of the cars in the United States are equipped with power-saving devices to check up the motorman's skill and assist him in becoming efficient. The older, heavier rolling stock must be replaced by far lighter, faster, and more accessible cars with full automatic equipment before the full degree of success is had.

Standardization of equipment and a complete change in manufacturing methods must come. Cars must be turned out ready to run like automobiles, in large quantities and at a fraction of the present costs. They must be light and attractive. Cross-seats should always be employed. Two or three car types will be sufficient to meet the varying conditions throughout the country. Car trust certificates will then be attractive to the investor. Where older rolling stock is in use it should be segregated by types, so that the cars will not run hit-or-miss in heterogeneous bunches. The motor characteristics and speed should be classified with care and cars used on lines where they best fit the schedule requirements. All equipment should be kept clean and well-painted, brilliantly lighted, and wear an inviting look.

The use of specially constructed light-weight trail cars in rush hours and other periods of heavy traffic has proved of immense value in augmenting the service with a minimum of expense.

POWER AND OTHER POSSIBLE ECONOMIES

Possibilities in power economies include:

Consolidation of power plants, shutting down less efficient ones when demand permits.

Economies in generation.

Purchase of part of the power, if necessary.

Reduction of distribution losses.

Thermostat regulation of car heaters in crowded and overwarmed cars.

Elimination of the use of power as far as possible in shops and elsewhere during the peak. Keep work and freight cars off the line at such times.

A great field also lies in the car itself through the installation of efficient checking devices. To my personal knowledge as high a saving as 25 per cent of the power used to propel the cars was effected by such a means.

In the case of the track, war conditions have shown the need of standardization and how little excuse there is for demanding special rail sections that add many dollars to every ton bought. The fault may sometimes be charged to the city engineer, but it is just as likely to be due to the way the company engineer's theories are aided and abetted by the utterly needless increase in the weight of cars.

Electric switches automatically thrown by manipulation of the motorman's controller save time and money. Automatic signals on single-track lines are vastly more efficient than the hand-operated type so frequently used on many non-progressive lines.

The location of car stops is of prime importance. They should be so placed that a standing car will not interfere with other cars or general street traffic, and where lines branch off they should be placed so as not to block the main line. The exact location of each stopping place should always be indicated plainly by a sign, so that passengers will not delay the car movement unnecessarily by walking to the car after it has stopped. A walk of a car length adds in excess of eight seconds to the regular stopping time, reducing the car's earnings proportionally.

CO-OPERATION BY THE PUBLIC

Staggering of the hours of business could be carried out to a larger extent than now done so as to enable the rush-hour traffic to be spread over a longer period and with a minimum of equipment. Another kind of team-work is the application of the skip stop. Instead of imposing a hardship on the public, the decrease in the number of stops insures a quicker journey and more comfortable riding. It is also most important to secure the co-operation of the local authorities in all matters pertaining to faster operation on the streets, not by increasing the maximum speed but by reducing delays and removing causes of congestion along the tracks.

Loading platforms should be placed at all heavy loading and unloading points where street width permits. They concentrate passengers at the proper point ready for quick loading, reduce the height of the step into the car, save time, provide a safe, comfortable place for the patrons to stand, prevent accidents, and permit the general street traffic to proceed without delay, thus mightily relieving congestion. Few people would guess that the humble loading platform has a direct bearing on the rate of fare, but by enabling the car to make better time operating expenses are kept down. Where raised platforms are impossible the next best substitute is the so-called marked safety zone.

Traffic officers should always give precedence to the street cars over all other classes of traffic, as they carry twenty to one by all other means. The police should assist in keeping tracks clear from trucks and other vehicles. The left-hand turn for all vehicles should be prohibited at congested intersections. The rule of one-way traffic on narrow and congested streets should be enforced. Parking of automobiles should be regulated. Double-berthing of street cars should be the rule in all congested locations. The abolition of steam railroad grade crossings is of great importance. Jitneys should be regulated and their operating requirements made no less onerous than those imposed on the street cars.

These important things, which are of great financial benefit to the electric railways and of equal value to the public, can be done without spending a dollar if there is co-operation between the railways, the local regulating bodies, and the public.

INCREASING THE EARNINGS

Attention will now be turned to methods of increasing the gross earnings which tend to reduce the operating ratio. This subject should have first consideration always.

The street railway is a retailer of transportation. A successful retailer drills his employees to be courteous and polite. Let the operating force of the average street rail-

way take charge of any prosperous department store and accord the same arrogant, uncivil treatment to its patrons that car riders are so accustomed to, and that store will soon have urgent need of the sheriff.

In the past it has been largely considered that people ride from necessity only as in going to and from work. Pleasure riding was supposed to consist principally in taking long trips. Curiously enough, almost the only attempt to induce people to ride aside from strictly necessary purposes was made in the establishment of parks at considerable distances from the homes of the riders. This meant that a large investment was carried for the sake of hauling people a maximum distance perhaps ninety days in the year.

Until recently few have believed that the way to create traffic is to give so frequent a headway with such attractive cars that people would voluntarily quit walking, except for very short distances. Experience in many towns, especially with the automatic safety car, has demonstrated conclusively that there is such a thing as a "riding habit." People will and do ride for short distances that are profitable to the railway many more times a day than was considered possible. In other words, the electric railway is coming around to the standpoint adopted by some of the more enterprising gas and electric companies a decade ago, when they discovered that there are many more ways for selling their products than following the "take-it-or-leave-it" plan.

Often a line is suffering from a too infrequent headway. Patrons walk who might be induced to ride. I have in mind a line that made the following record as the service was gradually increased:

Headway in Minutes	Earnings per Car per Day
8	$21.00
5	25.00
4	29.00
3	35.00
2½	40.00

This line was developed in less than one year from a non-paying line to one of the best on the system simply by giving more service.

Where the headway is comparatively infrequent it should always be some even part of an hour. The rider readily learns when to expect a car under one plan and can tell nothing about it under the other.

Perhaps the most important feature in selling transportation is the human factor of polite employees on the cars. All employees, especially the trainmen and supervisory transportation force, should be trained in the elements of successful salesmanship, courtesy, and politeness. Publicity, smiles, and the same cheerful "thank you" that is customary in a well-regulated store are bound to put the electric railway on more nearly the same plane of good-will as any other business in a community. Platform labor alone amounts to 50 per cent or more of all the operating costs. Wages are now much higher and should attract intelligent, efficient help. Both motorman and conductor should be of the courteous sales type of employee rather than the type found driving a truck or in other unskilled labor.

Intensive, systematic instruction must supplant the slipshod and haphazard methods now employed, and will work wonders with raw material. If wages are to remain at a high level the cost of the turnover should be reduced enormously, because with the higher rate of pay employees will stay and the company can well afford to spend a considerable amount on the instruction of each individual.

The Safety Car

Few managements today realize the full significance of this car and the tremendous possibilities that lie before it. Probably the best way to give an idea of its worth is to apply the concrete illustration of what should be expected if the average company mentioned in the foregoing part of this paper decided to adopt it in lieu of the present equipment of two-man cars.

The average company doing a $1,000,000 business annually will require available for daily service approximately seventy-five cars, including extra for shops and emergency. To substitute safety cars, 135 would give double service on the basis of a 10 per cent increase in schedule speed (instead of the maximum of 20 per cent obtainable). At the present time this number of cars would cost fully equipped about $6,000 each, or a total of $810,000. The old cars should be sold for whatever they will bring. Meantime the new equipment must be paid for and the increased interest provided. Increased earnings occasioned by the doubled service should be at least 50 per cent. To be conservative, however, an increase of but 33 per cent is assumed. Compare this operating statement with that of the average company under old methods of operation:

Gross income		$1,333,000
Operating expenses	$750,000	
Add 10 per cent purchase price of new cars	81,000	831,000
Earnings from operation		$502,000
Deductions:		
Taxes (adjusted)	$20,000	
Replacement fund	80,000	
Interest on new cars	27,000	
Interest 6 per cent on $4,000,000	240,000	367,000
Surplus		$135,000

In going into the details, it is found that the miles run by the company have increased from 2,500,000 to 5,000,000. The earnings per car-mile have not gone down to half, but are decreased from 40 cents to 26.6 cents. The car-hour earnings have been reduced only from $3.36 to $2.46, and the operating ratio has gone from 75 per cent down to 63 per cent. This is in spite of the change from the theory that cars are going to last indefinitely to using them intensively and obtaining the full value of them in ten years, after which they can be replaced, as you would an automobile, with the latest model.

With the one-man safety car alone an average company now operating with a deficit can be made to carry all its present burdens, pay out for the new cars on a basis of ten-year life and earn a comfortable surplus which can be used to: (1) reduce the fares; (2) still further improve the service.

I believe the safety car has a much wider range of applicability than has yet been attempted. Even large companies can undoubtedly use many of them to advantage.

Fares

If after everything has been done to increase business, effect operating economies, and lower taxes to a normal basis a deficit still remains after providing for the necessary and proper fixed charges a raise in the rates of fare should be granted. There are a number of ways to do this, as follows: (1) a charge for transfers; (2) an increase in the flat rate; (3) zone fares, or fares based on distance.

A 1-cent charge for transfers will usually yield from 3 to 5 per cent additional revenue. An increase in the flat rate of fare can scarcely be called a success as yet. An increase of 1 cent usually leads to 2 or 3, and as the flat rate goes up the number of riders decreases correspondingly. A number of cities have gone to 10 cents with disappointing results financially. High fares encourage walking, and the short-haul patron disappears. He is the only profitable customer the street railway has had in years. Provided the fare has to be raised it should be done so as to retain and encourage the short-haul rider, develop community riding, and increase the receipts. Experience has shown that a high flat rate does not accomplish this. The successful merchant gives an apt illustration when with rising costs he reduces the contents of the package and keeps the price the same or even lowers it.

At present a great deal of publicity is being given to the possibilities of motor buses to replace non-paying street car lines, and it has even been predicted that the street railway industry is doomed. These predictions are based largely on the operations of jitney lines, where the buses are running in competition with the street cars and skimming off the best of the short-haul business, or where operations of the buses are made possible by higher fares, such as on the Fifth Avenue Coach Company of New York City where a 10-cent fare has been charged for years.

The bus, with its limited carrying capacity, requires a higher ratio of man power per passenger carried. The greater number of units increases the congestion and street accidents. The cost of fuel and repairs is much higher per car-mile. The bus has higher depreciation. The street car wears out its own roadway of steel rails while the bus wears out the paving laid at great expense by the public. Where any considerable volume of traffic exists, motor bus service, considering everything, costs more than good street car transportation should. There are many places, however, where the bus can be employed to the great advantage of both public and company. There are other places where the bus should not be allowed. Unquestionably, however, the companies should study this with a view of co-ordinating bus service with the car service, where use is warranted as a part of the general transportation scheme.

FUTURE OF ELECTRIC TRACTION

Today, in spite of the fact that there are upwards of 6,000,000 passenger automobiles in operation in the United States, the demand for rapid, safe transportation was never so great, nor were there so many people to be moved. Good street railway transportation is not only desirable but is indispensable. In fact, on the quality of the service rendered by the local traction systems depends largely the degree of prosperity, importance and growth of the locality served.

In order that the street railway industry be placed on a firm financial footing and be enabled to grow, it must be made to pay. As a whole it is not doing so today. Therefore, either the outgo must be reduced or the income increased, or both. To accomplish this, better methods of financing and operating must be employed. Managements must employ all the arts of successful salesmanship combined with economies.

One of the fundamentals that must be recognized is that repairs alone, no matter how efficiently done, will not make antiquated equipment attractive or efficient. Replacement costs covering obsolescence of rolling stock and plant must be provided the same as any other operating charge.

Co-operation of the public and authorities is important, not only to the company but much more so to the people and the community served. High-class, efficient urban transportation makes for business prosperity.

RECAPITULATION

To enable the street railways to get out of the serious situation in which they now are the following can be done:

Reduce taxation to place the street railways on a par with other industries.

Employ operating economies such as:
- Better and faster schedules;
- Reduction of layovers;
- Improvement of routing;
- Abandonment of non-essential service;
- Standardization of equipment;
- Saving of power;
- Elimination of waste.

Obtain the co-operation of the authorities and the public in the following:
- Installation of loading platforms;
- Co-operation of the police;
- Regulation of street traffic;
- Control of parking;
- Elimination of steam railroad grade crossing;
- Regulation of jitney and bus competition;
- Staggered hours of business;
- Skip stops.

Employ methods to increase the gross receipts, such as:
- Encourage short-haul riding;
- Shorten headways;
- Replace insolence and inattention with courtesy;
- Drill employees in principles of salesmanship;
- Reroute to increase business;
- Use the safety car and more attractive cars generally.

A raise in fare by itself, without employing methods to induce and encourage profitable riding, or without employing more efficient methods of operation will fail.

Automobile and bus transportation is far less economical than efficient electric railway service. By the adoption of the remedies proposed, good street car transportation will be retained and the industry made self-supporting.

Fair Return on Railway Properties*

BY EDWARD W. BEMIS
Consulting Engineer, Chicago

IN DETERMINING whether the street railways are securing a fair return, two tests may be employed. The first is whether the property is earning from 6 per cent to 7 per cent on the estimated cost of reproduction new today less depreciation from physical causes, obsolescence and inadequacy. The second is whether the company is earning a similar fair return on the actual cost of the property now in use, less depreciation and with due regard to the history of the investment. If the company has not earned enough in the past to take care of depreciation, allowance must be made for this in some form. On the other hand, if the company has earned much more than a fair rate of return on the actual investment, weight must be given under this theory to that fact.

Under the first theory, which may be called the "reproduction theory," the company can and does make large claims.

Under the second or "historical theory," adopted to a large degree by some state public service commissions such as those of Massachusetts, New Hampshire, Indiana, Illinois, a valuation is reached which is usually much below the outstanding securities, but which, in my judgment, is an equitable theory. The reproduction theory appears to me unfair and unjust to the public. The historical theory often bears down heavily upon investors, but the number of really innocent investors in such securities must be rapidly diminishing.

AN IMPORTANT CONCLUSION FROM THE HISTORICAL THEORY

From the United States census volume on street railways for 1912 and from the summary of the 1917 volume on pages 46-51 of the *Aera* for August, 1919, it appears that the census bureau has divided all railways into four classes: elevated and subway, and classes A, B and C. Class A includes railways having gross operating income of $1,000,000 or more per year and includes about 100 companies; class B, includes those having from $250,000 to

* Abstract of statement made before Federal Electric Railways Commission, Washington, Oct. 4, 1919.

$1,000,000 per year of gross income and includes about 150 companies; class C includes about 700 small companies of less than $250,000 of gross income. It further appears that the net operating revenues available for interest and dividends in 1918 was $192,615,567, in all these companies or 84.1 per cent of the amount, $228,898,968, in the calendar year 1917.

Applying this percentage to the net operating revenues for 1917, as reported on page 5 of the August *Aera,* this result would follow:

NET OPERATING REVENUE PER MILE OF TRACK

Year	Elevated and Subway	Class A	Class B	Class C
1917 (Actual)	$51,485	$7,893	$3,461	$1,877
1918 (Estimated)	43,299	6,638	2,911	1,579

These estimated revenues, if capitalized at 6 per cent would amount to the following, per mile of track:

CAPITALIZATION OF NET EARNINGS AT 6 PER CENT, 1918, PER MILE OF TRACK

	Elevated and Subway	Class A	Class B	Class C
1918	$721,650	$110,633	$48,517	$26,317

My experience in appraisals of surface lines has been that the above amounts are as much as the cost of the property now in use, less depreciation. In other words, the companies are still earning 6 per cent on the average on the fair value according to the historical theory. There are, of course, many exceptions to this. There are three classes of street railways, those not wisely nor prudently built; those once profitable but now incapable at any fare of becoming self-sustaining due in part to competition with other means of transportation; and the majority of our larger roads which have earned during the past five years and during their entire past history, and probably are even now earning, a fair return on their capital investment. Conditions are gradually improving with regard to net operating revenue as well as with regard to gross revenue, since March, 1919.

Some Suggestions

The public may buy on a liberal capitalization of recent and prospective earnings and may operate, or it may ignore and replace by buses the companies that are not making any adequate return and are not likely to do so, at any rate of fare, provided the companies retire from business. Even where the companies might make more on a 6-cent or 7-cent fare than on a 5-cent fare, it may be better for the cities to buy them out and operate them than to permit an increased fare. But it is difficult to subsidize these companies when in private hands. The companies should be forced to greater economies in the use of one-man cars, economy in use of electricity, skip stops, honest collection of fares, etc. Under municipal ownership, paving charges could be shifted to the general tax budget and even extensions could be built in part, at least, by special assessments of abutting property.

Most of our larger street railway systems, if not largely over-capitalized can go on successfully, I believe, under a 5-cent fare, but if largely over-capitalized they probably must go through bankruptcy proceedings or must voluntarily readjust interest and rentals.

Fundamental in any system of regulation or ownership is the determination of the cost of the properties now in use, less depreciation from all causes. I have always believed in municipal ownership and operation of public utilities, but dread its coming at an exorbitant valuation.

Camden's View of the New Jersey Zone Plan *

By E. G. C. Bleakly
City Counsel, Camden, N. J.

THE zone plan of collecting fares in New Jersey seems to be a complete failure. Of course, we can only speak with certainty for the City of Camden and vicinity. The fact that both political parties in this State condemned the system in their respective platforms simply expresses public sentiment.

We do not want to be understood as saying that *a* zone system is not theoretically a proper system, or that *a* proper zone plan could not be made successful. What we do unhesitatingly say is that *the* zone plan inaugurated here is a complete failure. Our experience is that within the limits of the City of Camden, possibly a 3-mile limit from our ferry terminal, which is the gateway of the city, the present system has caused an average delay of twelve to fifteen minutes in the headway of the various car lines. The chief delay is in the making of change on the pay-as-you-enter plan. If the nickel fare had been a part of the system, of course, the making of change would have been expedited, but the Chamber of Commerce here and the city officials have recommended two propositions which might be used in connection with a proper zoning system.

1. At the heavy loading points, the main one of which is our Pennsylvania Ferry, there should be two or more ticket selling booths to permit passengers to secure tickets in advance of entering the cars, so that all they would have to do would be to hand the ticket to the conductor or drop it in a slot. This would tend to a speedy loading of every car. We, however, made special note that it would be of no avail to open up such ticket booths unless strip tickets were sold at a reduced rate over the normal fare. For instance, if the normal fare were 6 cents, six ticket strips should be sold for 25 cents, or some similar reduction. This would furnish an inducement to passengers to buy in advance of entering. The advantages of such a plan to the company would be that—

(a) It would gain by selling tickets at wholesale, the overhead cost of selling being thus reduced.

(b) It would gain the use of the money because many of the tickets will be a week or more in being used.

(c) Many tickets would be lost or destroyed.

(d) It would encourage the riding habit. A passenger does not think he is spending money when he is dropping in a ticket. He will, therefore, ride more frequently.

2. We recommend commutation tickets for the suburbs. Our problem here is not only to supply the residents of the city, but we have five or six thriving suburbs, all of which have steam railroad connections.

When the present zoning system was put in operation it was found that starting with the 3-cent fare, the increase at the distance of about 14 miles, on a 2 cents a mile increase, ran up to about 30 cents, while the steam railroad company, for a similar distance, was selling a commutation ticket for about 15 or 16 cents, including 2½ cents for ferriage to Philadelphia. So when it was found that nearly all the suburbs had the same steam railroad rates, almost half what the new trolley zone rates were, the suburbanites immediately forsook the trolleys and bought commutation tickets on the steam railroads.

3. It might have been thought that the 3-cent riders would have hailed such a system with joy. The contrary seems to have been the practical result. So much for theory against fact. Some of the 3-cent riders boycotted

* Abstract of statement placed before Federal Electric Railways Commission, Washington, Oct. 3, 1919.

the trolleys out of sympathy, refused to ride because they would rather pay a nickel than wait for change, but most of the riders in the 3-cent zone would naturally walk. From a practical standpoint we should say that there is not much travel in a 3-cent zone of 1 mile, except in large cities, where the population is concentrated. Whatever the reason, even the 3-cent zone has not been popular.

Generally speaking, we think the main cause for the failure of the system within the city limits was because of the many objectionable features attending its inauguration. Aside from those enumerated, so-called "bull pens" were provided; that is, shed structures surrounded by fences with turnstiles for entrance and exit. For some reason or other the people were against the use of these pens and resented their installation.

We think also, the conductors and motormen objected to the delays and other complications of the system. We have heard that it was claimed on behalf of the company that some employees objected because the system prevented peculations. On the other hand, some of the employees said that it furnished special inducement and special opportunities for peculations.

Our ferry company handles, at the Pennsylvania terminal, more than 30,000,000 people annually. That is as many as go through the Broad Street Station, Philadelphia. It is the gateway for all south Jersey. A large number of these passengers go through the two ferry entrances, one on the south side and the other on the north side of the street. There is a ticket selling booth about 15 ft. east of each ticket collector. Most people have purchased tickets in advance and they simply tear one off and drop it into a receptacle, stopping hardly a fraction of a second, so that there is no congestion even in the busiest hours. There is no making of change except at the ticket selling booths and the selling of tickets is distributed over a longer period of time, because all people do not run out of tickets at the same moment. This tends to avoid congestion even at the ticket selling booths at the heavy loading hours. Such a system, in our opinion, would be ideal for the local trolley company.

How the Railways Can Be Rehabilitated*

The Evils of the Past are Condemned and the Author Says That Any Program for Rehabilitation of the Electric Railway Properties Must Have Efficient Operation as the Primary Plank

BY MORRIS LLEWELLYN COOKE
Consulting Engineer, Philadelphia, formerly Director of Public Works, Philadelphia

OUR street railways constitute, broadly speaking, the most completely discredited feature in the administration of a city. The public, remembering not only past wrongs but having in mind present-day inefficiencies, does not take any interest in lightening the burdens of the managers, but seems anxious to precipitate what may easily develop into a national tragedy. This antipathy to the owners and the conviction so generally entertained by the public that all adventure has gone out of the street railway business when operated as a private undertaking, this commission, I believe, will find the greatest obstacles to putting into effective operation such constructive suggestions as it may make. Continued adversity might win over the most obdurate director to enlightened management, but without the hearty co-operation of the public almost nothing can be done.

My own impression is that the differences between the public and private interests involved have become irreconcilable. The operators of these properties—and especially their promoters—have erred so grievously against the public that except on isolated properties and where conditions are exceptional no compromise is likely. In most situations it would seem to me highly improper that a compromise should be reached on any basis thus far suggested by the private interests involved.

While I am not opposed to government ownership as such—and especially not for the reasons usually advanced against it—I would view with more than concern any considerable or immediate broadening of the functions and responsibilities of our municipal administrators. We are doing far too much of our present task in an indifferent fashion to make it wise to add to the burden, and for this reason I would welcome any scheme which would permit a further period of private operation. But, frankly, in view of the public attitude I see no adequate solution which does not involve a maximum of public control, or probably of public ownership and public operation.

Before suggesting the constructive steps which I believe must be taken before the street railways can be put on anything approaching a satisfactory basis, I would like to point out a number of specific obstacles which stand in the way of a satisfactory settlement of this problem.

Because the profits have been made through financing these properties rather than through operating them as public services the valuation factor has from the first been over-emphasized. In fact, up to a recent date one hardly ever heard the "efficiency of operation" factor mentioned. As a result of my experience I should estimate that on July 1, 1914, the face value of the outstanding securities of these undertakings represented almost twice what might be considered "fair value" as estimated by fair men unschooled in the equivocations and mirages so assiduously conceived by versatile lawyers and valuation experts during the last twenty years. While my inquiries in the street railway field have not been as conclusive as in the electrical field, everything points to an alleged value bearing to real value a ratio of at least two to one.

The unity of the banking control back of these properties usually speaking through such organizations as the American Electric Railway Association, the American Gas Association, and the National Electric Light Association, makes it possible to determine even illicit policies and plans and put them promptly into pretty general practice throughout the country.

These associations, while nominally distinct and each interested in a different industry, work in the closest possible harmony. Practically the same group of what might be called "investment financiers" virtually control all these associations.

Notwithstanding these organizations for united and nation-wide action on the part of the private interests involved, there is no administrative agency to unite and safe-

* Abstract of statement made before Federal Electric Railways Commission, Washington, D. C., Sept. 30, 1919.

guard the public interest. Because of this, many obvious wrongs have been permitted simply because there was no adequate way of voicing the opposition, although the United States Bureau of Standards, the Association of State Public Service Commissions and the Utilities Bureau have all done what they could with hopelessly inadequate funds.

Further complications were introduced by the valuation of the street railroad properties under several different systems, according to the use to which such valuations were to be put, such as taxation, rate-making, issuing securities, etc.

Difficulties in the Way of Improvement

It is because those in charge have had their attention centered on financial rather than on operating considerations that past and present untoward tendencies have not been discounted and offset more effectually. The present deplorable state of our street railways was not reached over night and is not due to any one single cause, but if their managers had been "on their jobs" the remedial measures which we are now discussing would have been inaugurated years ago. The point I want to make is that while the situation has doubtless been precipitated by the war, conditions incident to the war had very little to do with it.

The attitude of the owners of these properties is such as to make it very difficult for the public to get at the facts. Propaganda supporting officially authorized theories of valuation, methods of accounting, principles of management, etc., are carried on in every direction. It was the American Electric Railway Association which some years ago startled the country with its plan for influencing education at the source. I criticised this policy in two lectures on utilities delivered in 1915 in several Eastern universities.

It may help to an understanding of the whole situation to mention another difficulty in the path of street railway reconstruction. Owing to the manner in which this industry was developed the engineers who practise in the utility field are almost without exception subordinate to and usually subservient to the financial men. In a paper entitled "Some Factors in Municipal Engineering," read before the American Society of Mechanical Engineers in 1914, this subject was discussed at length.

This situation has improved somewhat recently because of the larger number of engineers employed by the state commissions and on publicly-owned utilities. But as long as the private interests pay salaries so out of proportion to those paid by the public, and so long as they are allowed to discredit and even ostracize those practising as public engineers, the most experienced talent will be found serving the private companies. I am convinced that no engineer or valuation expert has any right to practise on both sides of these questions. There are good men practising on either side, but to practise on both sides with the terminals as far apart as they are today and have that practice fair to the public is a hopeless undertaking.

Suggestions for Relief

A good many suggestions for relief have been made which would be acceptable except for the fact that there is no equitable or confidence-inspiring method of putting them into effect. For instance, I would be in favor of paying out of the tax rate such portion of the expense of an obviously desirable and non-self-supporting improvement as the Cambridge subway in Boston as might be shown to belong to the community as a whole rather than to those who use it, if the bookkeeping methods current in the utility world were different from what they are and if the public stood a somewhat better chance in getting dependable technical advice in making the bargain.

At least theoretically we are all for some kind of a cost-of-service plan. But I am opposed to the kind which has been principally stressed before this commission, first because it will have a tendency to validate excessive valuations, and second because it will inevitably capitalize inefficiency. The proposal is quite comparable to the profit-sharing scheme so strenuously urged now as a cure-all for industrial disorders. Labor is not a bit interested in profit-sharing because labor has no confidence that it understands the rules of the game and has had no hand in developing these rules. Any cost-of-service plan initiated now would rest in most instances on a discredited financial base and be operated under accounting methods designed for an altogether different purpose than the one which I take it we all have in mind now, *i. e.*, the service of the public.

I am convinced that any program for the rehabilitation of these properties to be successful must have efficient operation as its primary plank. After all, it is much more fundamental to ask how they are operated than who operates them. One of the best illustrations I can cite of the accomplishment of efficient management is the record which has been made on the Philadelphia Rapid Transit System under the administration of T. E. Mitten.

How "Water" Can Be Absorbed

The question of what shall be done about the excess in valuation or "watered stock" remains to be answered. Where there is an excessive difference to be absorbed, as is the case in many cities, I suppose there is nothing to do but "let nature take her course." In any such case the readjustments incident to a receivership and a reduction in the "property investment account" will come as the inevitable retribution for past mistakes. It will be found that our old-time friend the "widow and orphan" will not suffer in this as much as we are sometimes led to believe. Some years ago I examined the investment lists of four of the largest savings funds in Philadelphia and found that among investments totalling hundreds of millions there was not one dollar in municipal utility securities. In other words, careful investors have been shy on these securities for some time.

But where the excess valuation is not too great and where efficient management has been installed, adjustments reasonably fair to all concerned and not involving too radical readjustments should be possible. Here again we can turn to Philadelphia for an illustration. Everyone knows that there is in the P. R. T. a large underlying layer of the purest water running into the tens of millions. I think it is a fair statement that as a result of the past ten years of careful management a part of this overcapitalization may be said to have been absorbed.

If Mr. Mitten continues his activities and along the most promising lines I think that it will be altogether possible for him further to reduce the discrepancy between real and alleged value. If present prices are maintained his task will, of course, be the easier. I can then conceive that at some future date there can be reached some conclusion as to what the "shortage" is and that this can be in part validated in an open and aboveboard manner by a public which is not without some measure of responsibility for its existence and in part carried by a cancellation of outstanding securities. After all, neither the city nor the security holders should advocate the revolutionary route of a receivership if the necessary adjustments can be made by a more orderly process. Any such settlement is contingent upon full evidence of good faith on the part of the company and the establishment of a progressive and efficient management of the property. In this Philadelphia situation unless the adjustment is reached by some such method as suggested, the community will ultimately insist upon a valuation made very largely for the purpose of exposing past wrongs and without any desire to give the management even a sporting chance.

Relief for Present Traction Conditions*

Suggestions Include: Valuation and Rate of Return to Be Determined by Disinterested Body, Ownership by Local Stockholders to Be Encouraged, Control of Service by City but Operation on Service-at-Cost Basis

BY THOMAS L. SIDLO
Attorney, Cleveland, Ohio

THE street railway is a public utility, existing primarily for public use and convenience and indispensable to an adequate municipal life. The people who have put up the money to make and sustain so useful a social agency are entitled to have their investment treated as a legitimate one and deserving of an adequate return. This is of course platitudinous and yet it will bear repetition in order to emphasize upon everybody's mind the mutuality of interest involved in providing and maintaining modern street railway service. So long as private ownership continues this reciprocal condition will persist, viz., the duty of the utility to serve and the moral obligation of the community to pay, and every effort to disregard it will result in the future, as it has in the past, in costly folly. When municipal ownership comes, if it does come, and the industry is transferred from private to public hands the partnership relation will be terminated, but the fundamental principle will remain. Inasmuch, however, as this eventuality is still quite distant, we may as well confine our attention to things as they are. Municipal ownership is surely no panacea, and there is nothing automatic or assured about its success. It is highly desirable when and where it works, it is highly undesirable when and where it doesn't work. Its desirability is fundamentally a practical question, not necessarily ethical or political.

Underlying the entire situation is the need for a mutual, frank, and openly-arrived-at finding of the real value of each street railway property and a fixing of a proper rate of return thereon. Except in some isolated cases, we have no such plan of procedure today. Valuations and capitalizations usually are simply what they happen to be. Even when fixed judicially, or determined by quasi-public agencies like state commissions, they seldom have a patent for accuracy or equity. Where they have been fixed by politicians, or that elusive thing called public opinion, they have usually been ungenerous and unfair. Where they have been fixed by unrestrained action of the companies, they have been all that the traffic would bear. In any event they now generally appear as a misshapen thing that has grown and expanded mushroom-like in periods of public generosity or carelessness and been dwarfed and stunted during intervals of public unreasonableness or indignation.

Certainly there is nothing scientific or well-balanced about the capital account of the average American street railway. Capital value must be revamped and rewritten, but not necessarily underwritten. It must be simplified and clarified so as to be understandable, must bear some real relation to property or plant value, and when determined be frankly and conclusively accepted by the owners and by the community. Until this is done no street railway property anywhere will do otherwise than continue to stumble along in its public policy, in its rendition of service and in its financing. When it is done, however, the first permanent and tangible step will be taken in the solution of the problem.

To the same body should be left the determination of the question of the rate of return. If left alone the rate would sooner or later be fixed by the sway of economic factors. Consequently, the real function of this board would be to determine what an investment of this character, surrounded by the circumstances and conditions which play upon it, must command in the way of a return in order at all times to invite investing capital. Now as to a "fair" rate of return. Whatever may be said of an unfair rate of return, there is no such thing as a fair rate of return. If so, then which is fair, fairer, or less fair, a 4¼ per cent return on a United States Liberty bond, a 5 per cent return on a Pennsylvania Railroad bond, a 6 per cent return on Cleveland Railway stock, a 7 per cent return on a Monongahela Traction & Light short-term note, or an 8 per cent return on an Empire Gas & Fuel preferred stock. The first is the prime security of the world, the remainder are quasi-public securities of varying standards. From the standpoint purely of return, which represents the fair rate? Can anyone say? He must be a modern oracle of Delphi who would have the temerity to answer.

Frankly, while there are certain rates of return that are manifestly unfair, *i. e.,* such rates as are oppressive or usurious, there is no such thing as a fair rate of return. The task of this body will really be to fix a return (which may vary) that will insure keeping the property financed and growing.

It is unnecessary to rehearse the difficulties, embarrassments and tragedies in street railway history that have resulted from financing by means of mortgage indebtedness. It is pretty generally agreed by everybody who has made a study of street railway finances that it will be a happy day when the lien-holder is eliminated from street railway ownership. His presence has been as hurtful to the company as to the community. He has been the chief cause of the spirit of absenteeism in street railway management and has probably done more to bring the industry into disrepute than the old-fashioned, "public-be-damned" operator. But how eliminate him? With an efficient cost-of-service plan, mortgage bonds are unnecessary as a mode of financing. A property can be financed by selling shares and selling shares exclusively. And these can be sold to purchasers living in the community in which the utility is located and should be so sold. The property will thus acquire an alert, informed body of owners, who will desire, along with security and certainty of return on their investment, that proper and adequate service shall be rendered the community. Such a body of security-holders, and none other, will see to it that the property has a management that recognizes and is able to administer the profit-making aspect of the job not only, but the public service aspect as well. The value of this sort of ownership arrangement has been eminently demonstrated in Cleveland. The fact that at the present time there is relatively no bonded indebtedness but on the contrary a predominant body of resident shareholders, is making the Cleveland plan a success as much as any other factor. The statistics of the ownership of the Cleveland Railway Company are worth incorporating here:

First mortgage 5 per cent bonds, 1931, amount outstanding $5,495,000.
Capital stock outstanding (Aug. 1, 1919) $28,724,400.
Number of stockholders, March 21, 1910, 2,732.
Number of stockholders, June 12, 1919, 5,202.

* Abstract of statement placed before Federal Electric Railways Commission, Washington, D. C., Oct. 3, 1919.

Average amount per holder, March 21, 1910, $5,372.
Average amount per holder, June 12, 1919, $5,520.

On June 12, 1919, 67 per cent of the stockholders owned less than $5,000 each, of capital stock; 55 per cent owned less than $2,500 each. Those who owned $5,000 or less, each, constituted 75 per cent of the whole number of stockholders; those who owned $2,500 or less, 57 per cent.

A total of 91 per cent of all the stock is owned by residents of Ohio. On Jan. 1, 1919, of a total of 5,168 stockholders, 4,619 were residents of Ohio and of this number 3,522 resided in Cuyahoga County. In other words, about two-thirds of all of the company's stockholders reside in Cleveland or its environs.

It is noteworthy that the settlement plan that has been in process in Toledo, the proposed Community Traction Company, contemplates this type of local ownership as one of the chief arrangements. The time is ideal for creating in each community in this country, through the agency of the stock of the local street railway company, an investment bearing a return larger than that earned by savings bank deposits, possessing inherent certainty and security and providing an open and ready channel for investment funds of those who have neither means nor leisure for studying the investment field.

The arrangement between the community and the company should be founded upon the basis of service at cost and control of service vested in the community. The latter should be permitted to require any quantity or quality of service deemed necessary or desirable for its proper life and growth, provided, however, that it is ready to pay, in the shape of an adequate rate of fare, whatever cost its service requirements shall entail. There should be no limit upon the city's right to prescribe service, except obvious impossibility of performance. At the same time there should be no limit to the company's right to collect such a rate of fare as will pay for the cost of service ordered.

Control of service should be exercised through the agency of a competent technical representative, who should be equipped with the necessary information and facilities to enable him to prescribe the kinds and amounts of service that changing conditions of community life require. Service orders should be final and without appeal by the company, except where they are obviously inordinate or impossible to meet or where the city is unwilling or unable to pay the cost of the service it is requisitioning.

This cost should include the labor charge, the operating charge, the power charge, the maintenance charge, etc., all according to the market. In addition it should include the "money charges," that is, the return to the company's security holders on their investment. This return should not be "fair" or "fixed," but it should be *certain* and in accord with the prevailing cost of money for this kind of capital requirement. In other words, it should be subject to ascension or declension, according to the necessities of the money situation, perhaps, however, with a fixed minimum which should always be assured. The reason for this is obvious. The cost of money is just as important and inevitable an item entering into the cost of service as labor and material and is as susceptible to the control of economic influences. This fact should be recognized and accredited. This applies especially where the type of security is to be common shares, either exclusively or predominantly, and where the effort will be made to keep these shares actively at par or in the region of par or in a price range that will be sufficiently attractive to invite fresh capital. The rate of return should not be susceptible to frequent or violent changes. This might give a gambling quality to the stock, but the rate should not be so immutably fixed as to make it impossible to recognize and meet changing money market conditions.

THE LABOR SITUATION

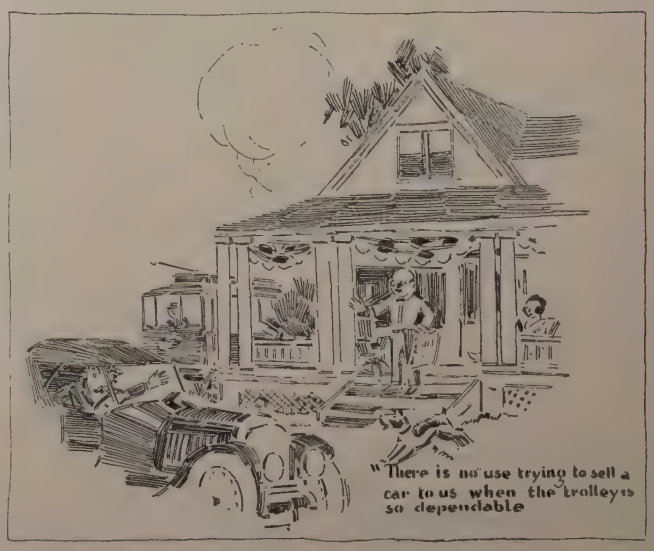
The labor situation is the most vexing and obstreperous problem confronting the street railway industry. From present indications it is likely to be still more troublesome in the future. No adequate solution has yet been found. In recent times street railway employees have found the strike an unfailing weapon to enforce their demands. At present it seems as if there were no definite limit to its possibilities. Some system of bonuses or some plan of profit sharing must be devised to bring the employees into the partnership relation and to force them thus to accept the responsibility their type of employment owes to the public. The need for some such solution is irresistible unless the present situation with regard to wages changes in a very marked way.

An aspect of the problem that is not at all clear relates to the question of the extent to which public officials should take a hand in labor disputes. From one standpoint a "hands-off" policy seems highly desirable. This has the elementary advantage of leaving the decision of the dispute to its merits. On the other hand, allowing the interested parties to fight it out to the bitter end usually means public suffering, an emerging of the mob spirit, violence, etc. For that reason it is necessary for the public interest to be represented. The best way to achieve this recognition of the public interest is through compulsory arbitration of all labor difficulties. This method will settle disputes without general punishment, will protect the rights of the employees, and will not seriously interfere with the employment relation or break down discipline. Its introduction in this country has already been delayed too long.

SUMMARY OF PRINCIPLES

To summarize, then, this memorandum contends for these things as conducive to a permanent and just settlement of the street railway problem in America:

1. A recognition of the inevitable mutuality of public and private interest in producing adequate street railway service and in paying in full for such service.
2. Settling the questions of property value and an adequate return to the owners free from demagogery on the one hand, and private greed on the other, and referring their determination to representative, disinterested citizens.
3. Banishing mortgage indebtedness as rapidly as possible in favor of stock ownership by the people of the community served.
4. Service at cost, but not less than actual cost, and unlimited control of service by the community.
5. Competent, technical administration of the problem of service by a qualified representative of the public.
6. In order to insure uninterrupted service, making the employees responsible partners in the enterprise, by offering adequate money rewards for length of service, and establishing compulsory arbitration of all labor difficulties.



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Electric Railway Journal

H. W. BLAKE, *Editor*

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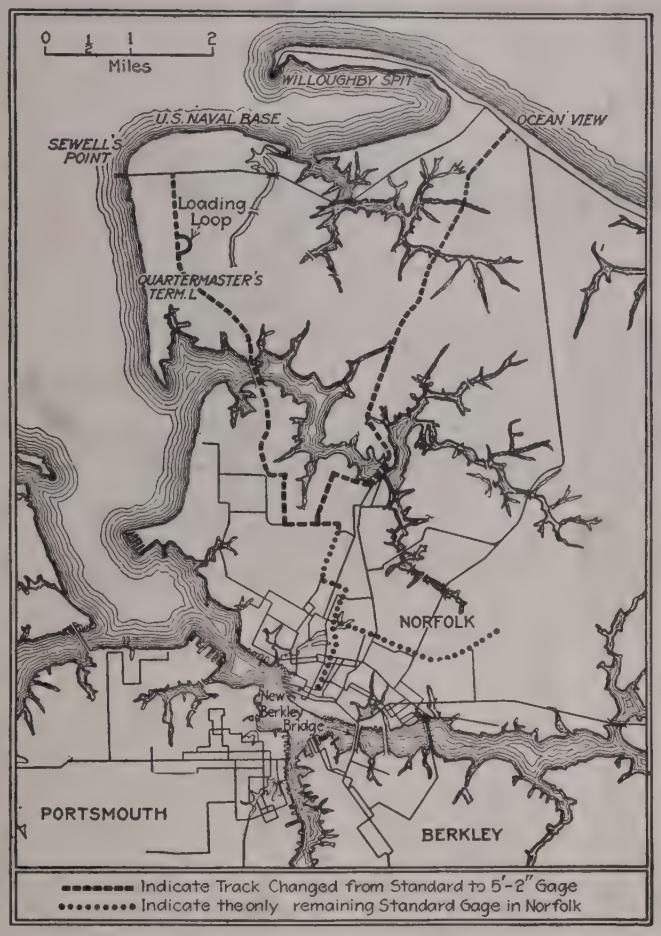

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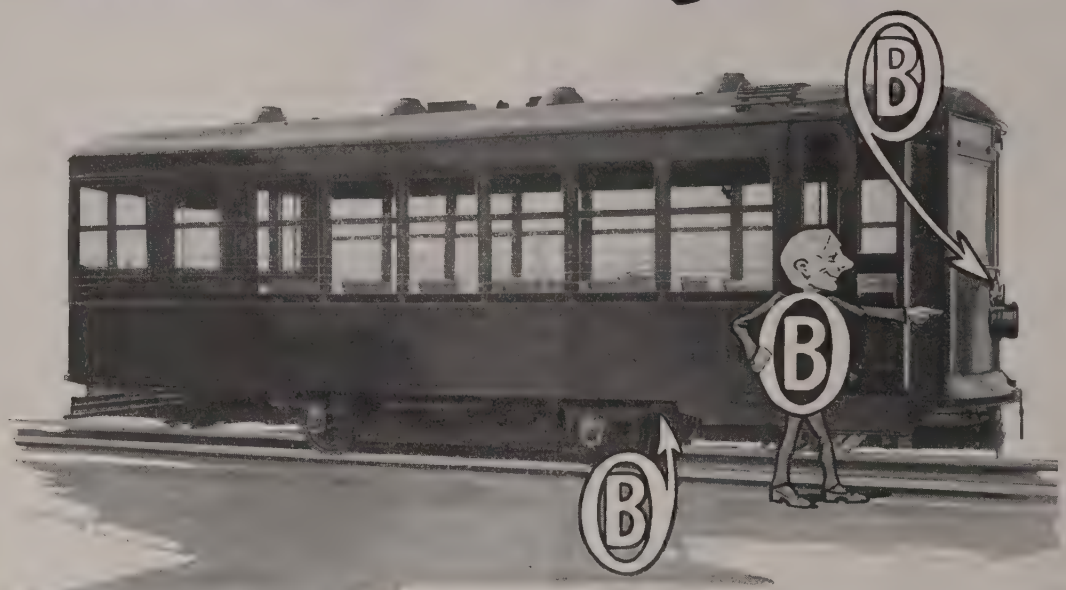
Successful In Big Cities Too



PHILADELPHIA RAPID TRANSIT is using One-Man Safety Cars. These compact money-makers have their place in big cities as well as small. With them it is often possible to transform losing ventures into profitable lines.

These new Philadelphia cars are equipped with O-B Catchers, O-B Sand Traps and Crouse-Hinds Headlights. The Philadelphia Rapid Transit knows from experience what those devices can do.

The Ohio Brass Company
Mansfield, Ohio

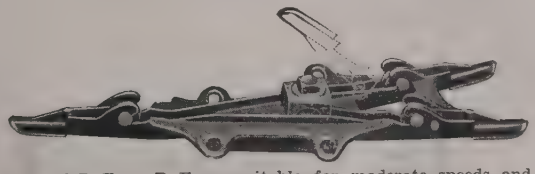
New York	Los Angeles	Chicago
Pittsburgh	Philadelphia	San Francisco

Exclusive Sales Agents in the U. S. for Crouse-Hinds Imperial Headlights.

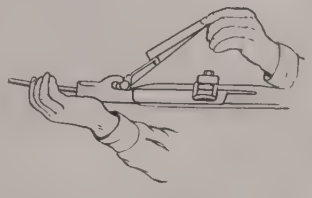
O-B PRODUCTS

Quality First

O-B Type E Frog, adapted for high-speed service and for use where several types of cars are operated over same line.—Patented.



O-B Type D Frog, suitable for moderate speeds and all general city service.—Patented.



Slip tip under hooks—

Watch an O-B Trolley Frog go on the line

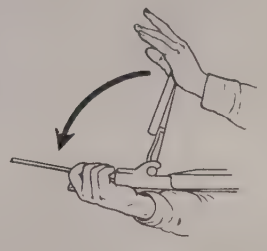
If you never watched an O-B Frog go on the trolley you can't appreciate its superiority.

The trolley wires are gripped securely by a single central clamp. Then the cam tips go on (see illustration). That's all.

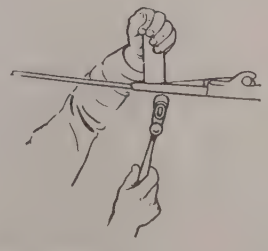
That simple, rapid installation means minimum traffic delay; it means there are no operations to be slighted or left out.

Then to speed, labor saving and thoroughness add long life. The sturdy O-B Frog is protected by O-B Sherardizing. The tough bronze tips which take the arc and wheel pound are renewable.

Order a trial lot of O-B Frogs. They cost no more than old style types.



turn over and down on the wire—



clinch the lips and the job is done.

The Ohio Brass Company, Mansfield, Ohio

New York Philadelphia Pittsburgh Chicago Los Angeles San Francisco

Phono-Electric

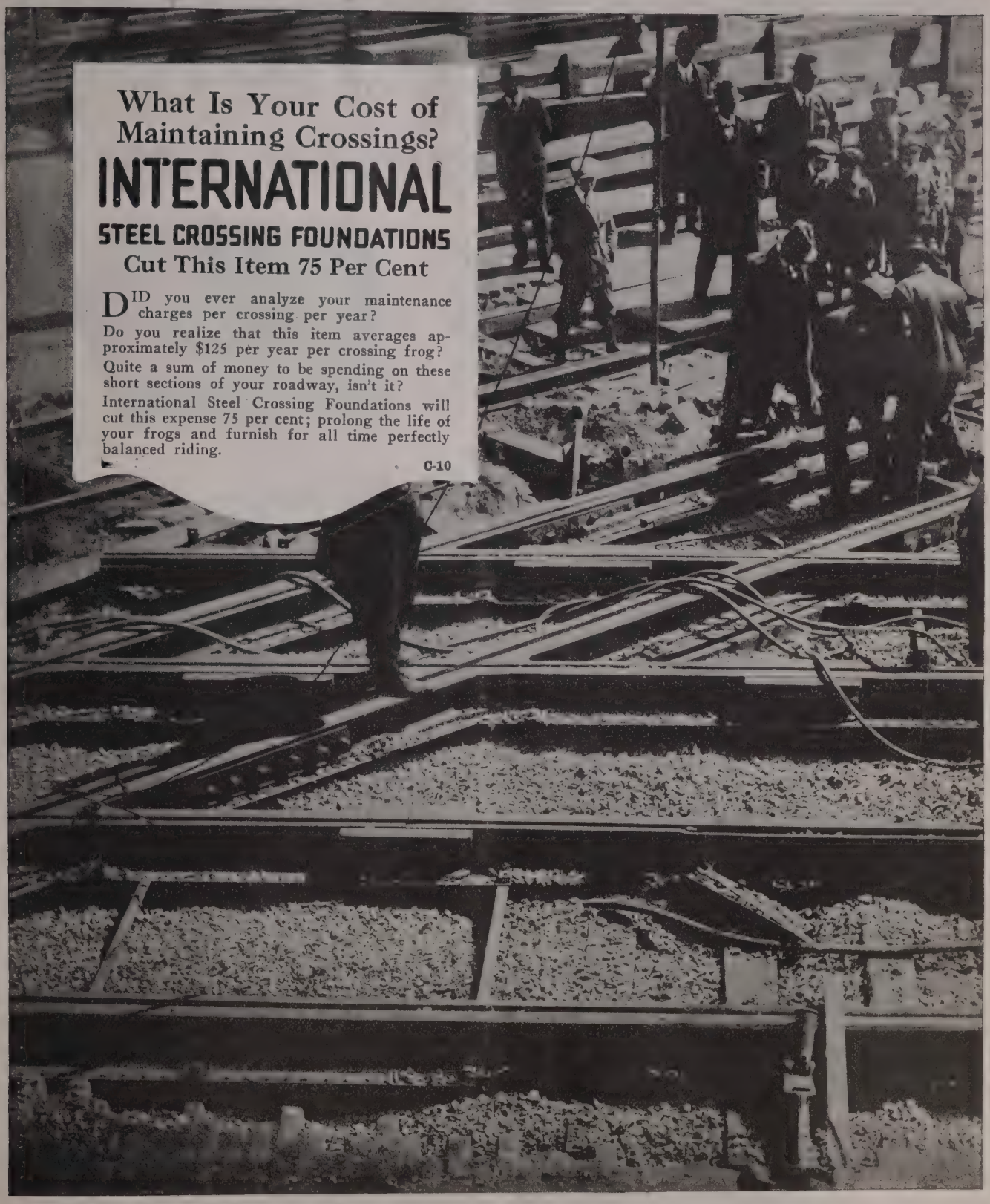
City or Interurban Cars in Dallas

The weight of car, the tension of the trolley base and the amount of current required does not phase Phono-Electric Trolley Wire. It is so strong, tough, ductile and capable of withstanding high temperatures that its superiority for big interurban cars is as manifest as for city cars.

Realizing this the Dallas Railway has installed No. 00 Phono-Electric Trolley Wire for the Jefferson Avenue line over which interurban cars enter Dallas.

And the Dallas decision is all the more interesting because the business district of Dallas has been Phono-Electric for years.

Bridgeport Brass Company
Bridgeport Connecticut


What Is Your Cost of Maintaining Crossings?
INTERNATIONAL
STEEL CROSSING FOUNDATIONS
Cut This Item 75 Per Cent
DID you ever analyze your maintenance charges per crossing per year?
Do you realize that this item averages approximately $125 per year per crossing frog?
Quite a sum of money to be spending on these short sections of your roadway, isn't it?
International Steel Crossing Foundations will cut this expense 75 per cent; prolong the life of your frogs and furnish for all time perfectly balanced riding.
C-10

The International Steel Tie Company

Manufacturers of Steel Twin Ties and Crossing Foundations

General Sales Office and Works: Cleveland, Ohio

Put These Bearings on Old Cars to Reduce Flange and Rail Wear

The wisest mechanical men are reducing wheel flange wear under their old cars, decreasing pull-ins for worn flanges, saving labor cost, and giving their way departments a chance to save too, by equipping present rolling stock with

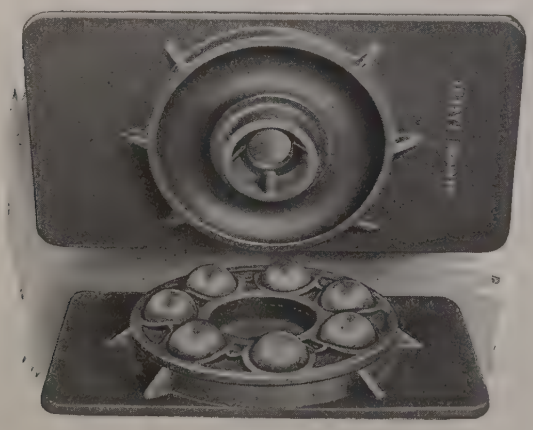
Perry-Hartman

self-centering center plates and anti-friction side bearings.

There is no economy in waiting to get new cars or trucks for this purpose when so many roads are installing Perry-Hartman bearings on old cars and getting results in time and money saved.

These bearings can be readily placed on almost any truck and body bolster. The side bearings, stop binding between the bolsters, which is the chief cause of excessive rail and flange wear. The centering center plates prevent truck nosing or lurching from side to side, which wears out rails and flanges and constantly racks the whole car body.

Moreover, the cost of these bearings is little more than friction plates. Their maintenance is nothing, and wheel turnings which they save will soon pay for the new bearings.



Reduce Flange Wear
Decrease Rail Wear
Lessen Derailments
Stop Truck Nosing
Increase Wheel Mileage
Save Power on Curves
Prevent Wheel Climbing

Send to nearest office for new catalogue describing these bearings and showing types of application.

Holden & White Inc.

Electric Railway Sales Distributors for The Joliet Railway Supply Company

817 Fisher Building, Chicago

National Railway Appliance Company, New York and Washington; W. M. McClintock, St. Paul; Alfred Connor, Denver; C. E. A. Carr, Toronto; F. F. Bodler, San Francisco; S. I. Wailes, Los Angeles; L. Brandenburger, Salt Lake City.

You Use a Screw-driver to Focus the New "Golden-Glow"—Headlights—Much Easier

In the new "Golden Glow" Headlights for city and suburban service another refinement in design has been made in that the lamp may be focused more accurately and with greater ease.

The mechanic need only turn the focusing screw which is found in the headlight case under the rim of the door. Thus he may move the lamp inward or outward and at the same time observe the effect on the beam. See illustration. Once focused this screw mechanism will hold it permanently.

ELECTRIC SERVICE SUPPLIES CO.

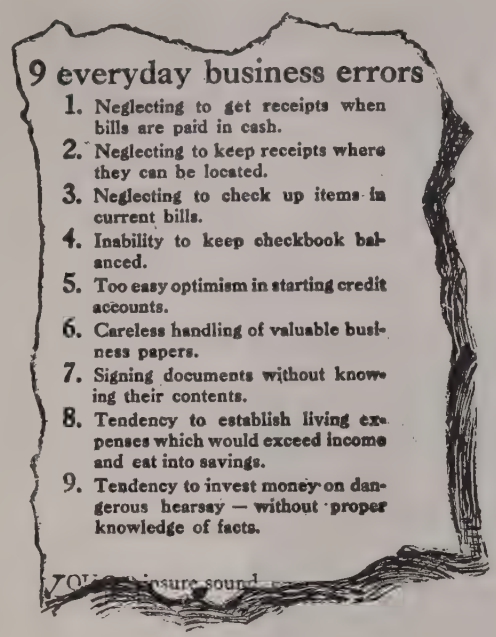
Manufacturer of Railway Material and Electrical Supplies

PHILADELPHIA
17th and Cambria Streets

NEW YORK
50 Church Street

CHICAGO
Monadnock Building

Canadian Distributors: Lyman Tube & Supply Co., Montreal, Toronto, Winnipeg


9 everyday business errors
1. Neglecting to get receipts when bills are paid in cash.
2. Neglecting to keep receipts where they can be located.
3. Neglecting to check up items in current bills.
4. Inability to keep checkbook balanced.
5. Too easy optimism in starting credit accounts.
6. Careless handling of valuable business papers.
7. Signing documents without knowing their contents.
8. Tendency to establish living expenses which would exceed income and eat into savings.
9. Tendency to invest money on dangerous hearsay — without proper knowledge of facts.

—The TENTH Error

This clipping from a recent newspaper advertisement, tells a valuable story. But it overlooks one of the *biggest* business errors—

Neglecting to use the

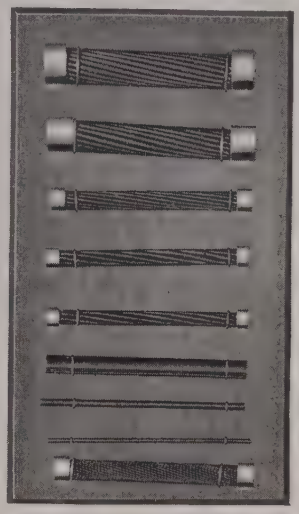
SEARCHLIGHT SECTION

It is a bad business error to overlook the opportunities that this Department puts at your disposal.

Whether you wish to buy or to sell—to secure contracts—to reach the men whose services you want or to whom you wish to sell your services

—the "Searchlight" offers you the opportunity to reach the largest possible number of your prospective customers.

0086



ANACONDA Copper Wire — from mine to Finished product

Anaconda Wire and Cable used in C. M. & St. P. Rocky Mountain Electrification

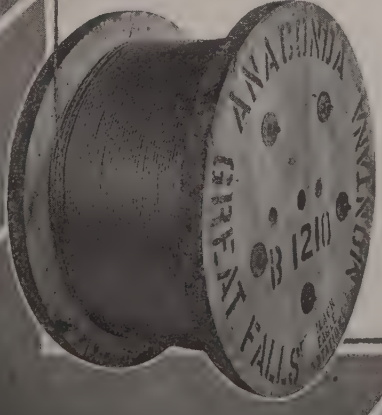
Wherever copper wire is used for conveying electric current, the name "Anaconda" is recognized as a standard of excellence.

So wide is the belief in the superiority of Anaconda products that millions of pounds of Copper Wire and Cable are shipped each month from our mills at Great Falls to supply the markets of the world.

Anaconda Copper Wire and Cable are manufactured in sizes and degrees of hardness to meet every requirement. Each step from the mining of the ore to the delivery of the finished product is carried out under the supervision of skilled workers in the Anaconda organization.

It pays to specify Anaconda. It's your guarantee of highest quality.

Write for a Copy of the ANACONDA Booklet Sent Free on request

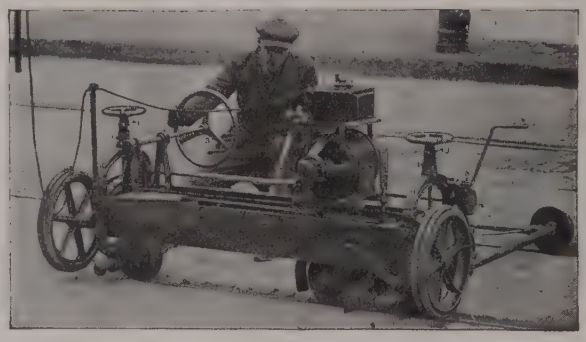


ANACONDA COPPER MINING CO.

Rolling Mills, Great Falls, Montana

General Office, Rolling Mills Dept. Chicago

Each Track Grinding Problem Successfully Met by Rotary or Reciprocating Grinders



We are now in a position to solve every track grinding problem that arises with the maximum amount of success.

To meet conditions where our Reciprocating Track Grinder would not quite give best results we have now bought out the Atlas Rail Grinder. This machine as you all know is a rotary and like the Reciprocating Track Grinder is so built as to give simplicity in operation, low maintenance and high efficiency.

New bulletins are being published as well as new features being added to it. It would be to your advantage to get in touch with us.

Many Electric Railways who are now using our famous Reciprocating Grinder also find use for the Rotary. Let us hear from you.

Railway Track-work Company

30th and Walnut Sts., Philadelphia

"Little Giant" Speed Makes Screw Spikes Economically Practical

LITTLE GIANT Electric Spike Drivers, by virtue of their speed and economy, have made possible the adoption of the screw spike—now widely recognized as far superior to the old nail spike. Screw spikes hold the tie right and do away entirely with that shattering of the fibres of the tie, which invites decay, and which invariably occurs during the sledging in of the nail spike. Today many railways are using the screw spike—and "Little Giants" for driving them. Watch a "Little Giant" on the job. The spike is set; over the head the operator places the "Little Giant;" the turn of a switch and the powerful rotary tool is screwing down the spike. When the pressure of the spike head against the rail has reached a predetermined amount—off goes the circuit breaker—and the drill stops. This means uniform holding tension at every spike.

The Little Giant Electric Spike Driver is but one of a line of electric tools for railway shop and track work, of which Little Giant Drills, Track Drills and Grinders, and Boyer Pneumatic Hammers are important members. Write for Bulletins.

Chicago Pneumatic Tool Company, 1062 Fisher Building, Chicago

Sales and Service Branches all over the World

Birmingham	Chicago	Detroit	Erie	Joplin	Minneapolis	Philadelphia	Richmond	Seattle	Barcelona	Brussels	Christiania	Honolulu	London	Montreal	Seoul	Vancouver
Boston	Cincinnati	Eldorado	Franklin	Los Angeles	New Orleans	Pittsburgh	Salt Lake City	St. Louis	Berlin	Buenos Aires	Fraserburgh	Johannesburg	Madrid	Osaka	Tokyo	Winnipeg
Buffalo	Cleveland	El Paso	Houston	Milwaukee	New York	Portland	San Francisco	Tucson	Bombay	Cadiz	Havana	Lisbon	Milan	Paris	Toronto	

EL19

BOYER PNEUMATIC HAMMERS · · LITTLE GIANT PNEUMATIC AND ELECTRIC TOOLS
CHICAGO PNEUMATIC AIR COMPRESSORS · · VACUUM PUMPS · · PNEUMATIC HOISTS
GIANT OIL AND GAS ENGINES · · ROCK DRILLS · · COAL DRILLS

LITTLE *Electric* **GIANT** *Tools*

Once more we ask: Have you posted yourself thoroughly on the improved service resulting from the use of

Lackawanna

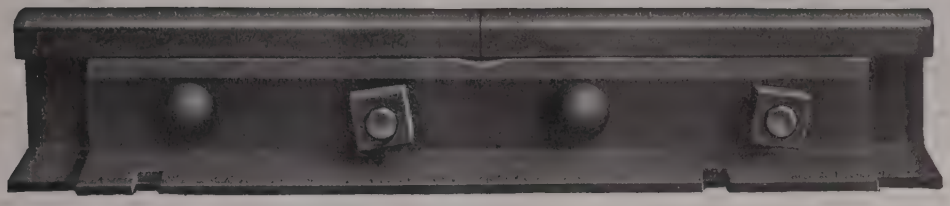
Safety-head Angle Bars?

Previous announcements of this series have dwelt at length upon broken angle bars, but not because broken angle bars are a novelty or of rare occurrence. Most of your fellow track men will acknowledge that broken angle bars make a serious and annoying problem for them as well as for everybody else responsible for safe track.

You doubtless fully realize the dangers of broken bars, and the desirability of employing any device that will prevent this trouble. We therefore wish to urge you once more to carefully read our previous announcements, if you have not already done so, and then give due consideration to the possibilities of making your rail joints safer. Once you understand and fully appreciate the Lackawanna Safety-head Angle Bar, the effective way in which it avoids the worst causes of angle bar failure, you will at least want to give this device a trial.

One of the first roadmasters to install Lackawanna Safety-head Angle Bars put them into service about six years ago on a section of main line track subjected to exceptionally heavy traffic and where the breakage of angle bars had become a serious and expensive menace. We are told that in all the time since Lackawanna Safety-head Angle Bars were installed not a single instance of a broken bar has been recorded on this stretch of track.

Lackawanna Safety-head Angle Bar and detail of the improved safety-head depression which prevents surface wear and cutting underneath the end of the rail head.



The use of Lackawanna Safety-head Angle Bars makes for safe long-lived rail joints and does so at a cost that leaves no reason for being satisfied with less efficient construction.

THE PRINCIPLE OF THE LACKAWANNA SAFETY-HEAD ANGLE BAR consists in depressing the hot metal at the location of the center of the head of the bar to a depth not exceeding ⅛-inch and for half an inch on each side of the rail ends where they meet. This prevents the sharp under corners of the rail heads at the ends from cutting or wearing into the bar and impairing the strength of the metal. The sectional area of the bar at the depression is not reduced, nor is the original rolled surface and finish changed in character. The bar therefore retains its full original strength at this most critical point, where with an ordinary angle bar wear is practically certain to develop and cause a dangerous condition.

We also make plain fish plates with center depressions in top and bottom to afford the same advantages.

Let us submit cost and performance data.

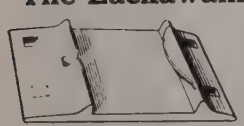
The Lackawanna Safety-head Angle Bar is *your own section* made break-proof

Other Lackawanna Aids to Better Track

The Lackawanna Deseaming Process

to which all our rails are subjected, leaves the rail head and base free from the cracks and weak, streaky, laminated, partially decarburized metal that under the ordinary manufacturing processes in an inherent cause of undue surface wear and rail fracture.

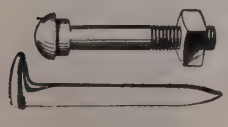
The Lackawanna Hook-Shoulder Tie Plate



is simple, strong, durable, convenient for installation, and by holding the rail with great security prevents undue wear and destruction of material, saves repair costs and reduces maintenance labor.

Two ribs on top form a channel in which the rail base rests. One of the ribs is plain and the other hooked to make a holder. One or two plain spikes on the plain rib complete the bond between plate and both rail flanges. The plate is fastened to the tie by independent plain or screw spikes. The rail may be removed without disturbing the plate.

Lackawanna Track Bolts and Spikes



Our track bolts and spikes of all standard sizes for light or heavy rails enjoy an enviable reputation for careful, accurate workmanship and finish.

The Abbott Rail-Joint Plate

strengthens and otherwise improves ordinary angle bar joints of standard and light tee and girder rails. Its use assures smooth running track surface without the necessity of constantly raising and tamping the joint ties, avoids annoyance and expense from worn and broken bolts and angle bars and protects the rail ends from battering and breaking down.

The hard steel and combination of reversing flange with the plate provides for internal stresses and imposes the load on the two joint ties with about the same action as between a short deck bridge and its piers. Upturned corner lugs engaging the ends of the angle bars act as anti-creepers and as rail guards to prevent misalignment if the angle bars break or become loose.

Abbott Plates are equally applicable to and advantageous on new or relaid track and will extend the life even of old track for several years.

These plates are made in types especially suitable for ordinary steam railway service, for use in paved streets and for welding to the rail base, and may be held with either screw or ordinary spikes.

Write for our booklets, "Lackawanna Deseamed Rails," "Lackawanna Improved Track Appliances," and "Lackawanna Track Bolts and Spikes."

Lackawanna Steel Company

General Sales Office and Works: Lackawanna, N. Y.

Atlanta Boston Buffalo Chicago Cincinnati Cleveland Detroit New York Philadelphia St. Louis San Francisco

Sole Exporter of Our Commercial Products: Consolidated Steel Corporation, 165 Broadway, New York.

Aluminum Cable Steel Reinforced

FOR ELECTRIFICATION WORK

A. C. S. R. has been in commercial service for 10 years with universal success. The above illustration shows the use of A. C. S. R. as catenary cable on The Lake Erie & Northern Railway in Ontario. This cable is the equivalent of two No. 4/0 copper conductors and represents the entire conductivity required for the operation of this road which is over 50 miles long. The trolley wire being of steel has a maximum of strength combined with minimum cost.

Aluminum Company of America

GENERAL SALES OFFICE

Oliver Bldg., Pittsburgh, Pa., U. S. A.

Canada: Northern Aluminum Co., Ltd., Toronto
Latin America: Aluminum Co. of South America, Pittsburgh, Pa.
England: Northern Aluminum Co., Ltd., London

Power Saving Plus Other Economies

From Transportation Standpoint

(1) A substantial saving in car propulsion energy consumption.

(2) Only device affording direct means for putting cash value on follow-up instructors' efforts in teaching motormen.

(3) Economies in scheduling and selecting various types of equipment.

(4) An open-face device which earns and retains the greatest goodwill of car crews toward power-saving work.

(5) Shows actual energy cost of one-car vs. two-car trains.

(6) Distribution system relieved of part of its load.

(7) Motormen cannot improve meter records by taking chances through deferring braking.

(8) Does not put premium on "cannonball" acceleration.

From the Mechanical Standpoint

(1) Shows most efficient equipment for given service.

(2) Less brake shoe and wheel wear.

(3) Less roasting of coils and grids.

(4) Quick detection of short fields, binding brakes, nosing trucks, etc.

(5) Not necessary to hold car out of service for meter repairs.

(6) Affords means for car inspection on the Kw. h. basis rather than time or mileage basis.

From the Record Keeping Standpoint

(1) Simplicity of record system.

(2) Completeness of mileage and power data.

(3) Determination of all revenue and non-revenue mileage by cars, and lines for general statistical work.

(4) Most satisfactory fundamentals for bonus system.

(5) Promptness in preparation of results for presentation to all interested.

(6) Direct presentation of power value items for changes in operating conditions.

Accident Savings

(1) Crews more watchful.

(2) Lower maximum speeds.

(3) More uniform braking.

ECONOMY ELECTRIC RAILWAY METER

The ECONOMY Railway Meter is the only "power saving" device which measures car operating efficiency directly in units of energy consumption. The only one permitting a direct presentation of results.

Also, the meter is the only device which functions both while, and in proportion to, the demands for power as they are being made. This is an important factor on properties in hilly countries—important from the standpoints of power saving, safety first and satisfaction on the part of the motorman.

Write for new Power Saving Booklet

ECONOMY ELECTRIC DEVICES COMPANY

General Sales Agent

SANGAMO ECONOMY RAILWAY METER

Old Colony Bldg., Chicago

National Railway Appliance Co., New York — Burton R. Stare Co., Seattle — Ludwig Hommel & Co., Pittsburgh
L. A. Nott, San Francisco — J. G. Monahan, Los Angeles

twelve years ago—

these 36-inch **ARMCO IRON** Culverts were placed in this little stream. Through every extreme of heat and cold that twelve summers and winters have brought, they have stood up staunch and sturdy, unaffected by rust, showing no sign of deterioration.

Installations such as this, made years ago in all parts of the country, have established the fact that **ARMCO IRON** Culverts are permanent improvements.

AMERICAN ARMCO INGOT IRON

LOOK FOR THE TRIANGLE TRADE MARK

There is a manufacturer in nearly every state and in Canada, making genuine rust-resisting ARMCO IRON CULVERTS and other products of ARMCO IRON such as flumes, siphons, tanks, road signs, roofing, etc. Write for full information and nearest shipping point on products in which you are interested.

ARMCO IRON CULVERT & FLUME MFRS. ASSN.

TRANSPORTATION BLDG. CHICAGO

National Pneumatic Door and Step Control

Means Less Delay in Congested Streets

A good deal of the lower schedule speed due to traffic congestion can't be helped; but some of it can.

For example: Higher rates of acceleration and braking as well as quicker closing and opening of doors reduce the losses due to traffic congestion, because they *save the seconds.*

And seconds count when you consider that in a congested section, a car is likely to stop at every block to take on or discharge passengers.

Therefore, it is necessary for both motorman and conductor to be able to take advantage of any clear space up ahead and to be able to respond *instantly* to the traffic officer's *"Go-Go"*.

The use of laborless, practically instantaneous National Pneumatic Door and Step Control, including Safety Interlocking features, assures you that your men will have incentive to take advantages of every opportunity to save time because it's so easy for them to do it.

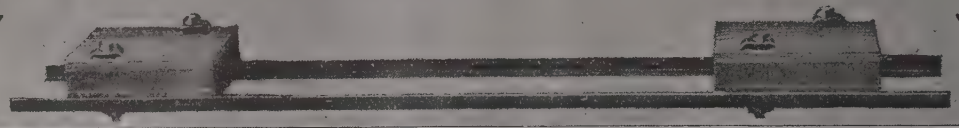
Whether you are installing National Pneumatic Door Engines alone or as a part of the famous Safety Combination of the Safety Car Devices Company, we urge that you also use the door shaft and step shaft devices of the National Pneumatic Company to secure the smoothest and most reliable operation possible with National Pneumatic Door Engines.

NATIONAL PNEUMATIC COMPANY INC.

50 Church St., New York **Edison Building, Chicago**

Works: Rahway, N. J.

The MECHANICAL RAILWAY TIE



Track Life Depends on

Resiliency

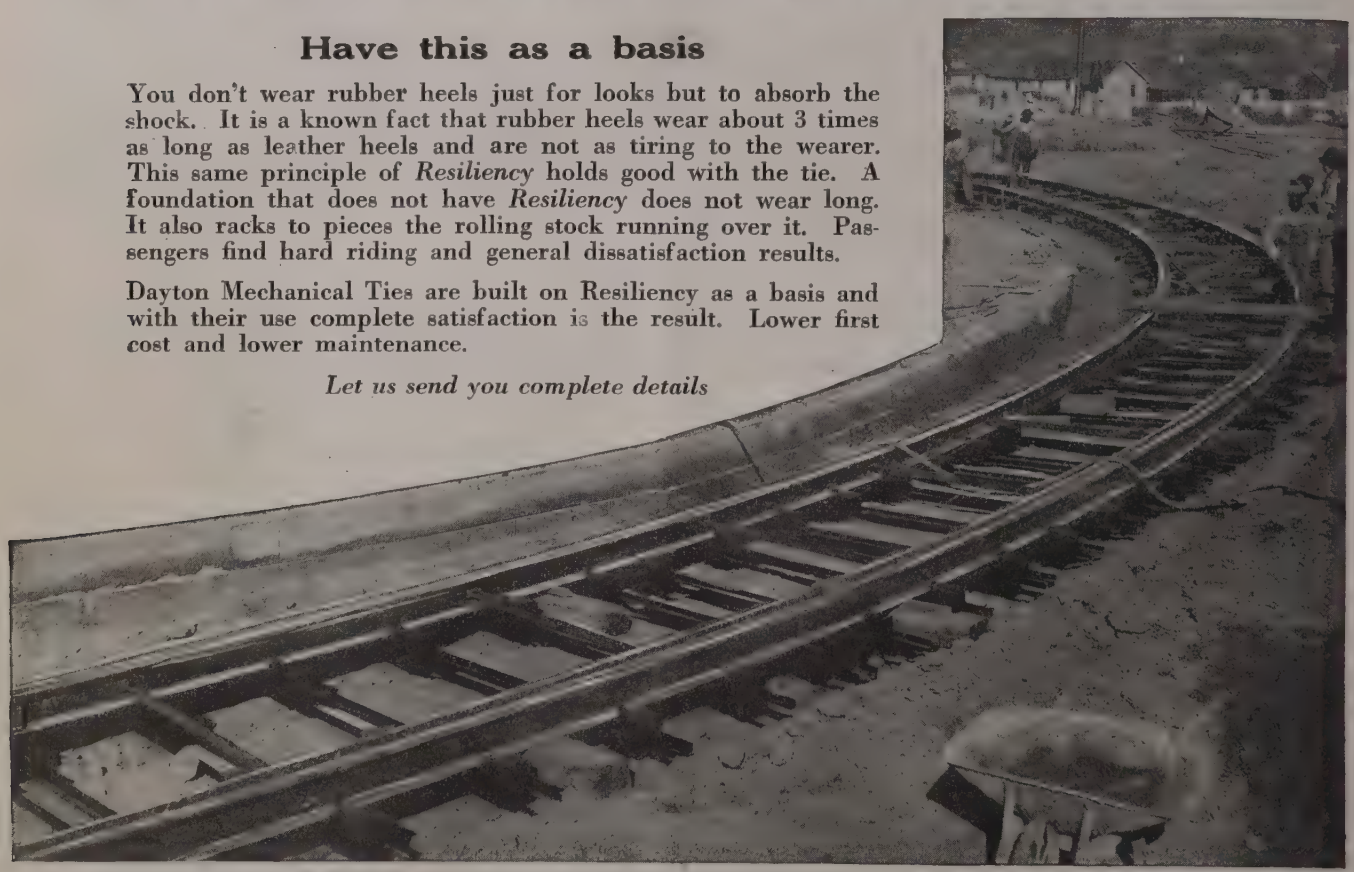
DAYTON MECHANICAL TIES

Have this as a basis

You don't wear rubber heels just for looks but to absorb the shock. It is a known fact that rubber heels wear about 3 times as long as leather heels and are not as tiring to the wearer. This same principle of *Resiliency* holds good with the tie. A foundation that does not have *Resiliency* does not wear long. It also racks to pieces the rolling stock running over it. Passengers find hard riding and general dissatisfaction results.

Dayton Mechanical Ties are built on Resiliency as a basis and with their use complete satisfaction is the result. Lower first cost and lower maintenance.

Let us send you complete details



THE DAYTON MECHANICAL TIE CO.
704 Commercial Bldg.
DAYTON, OHIO

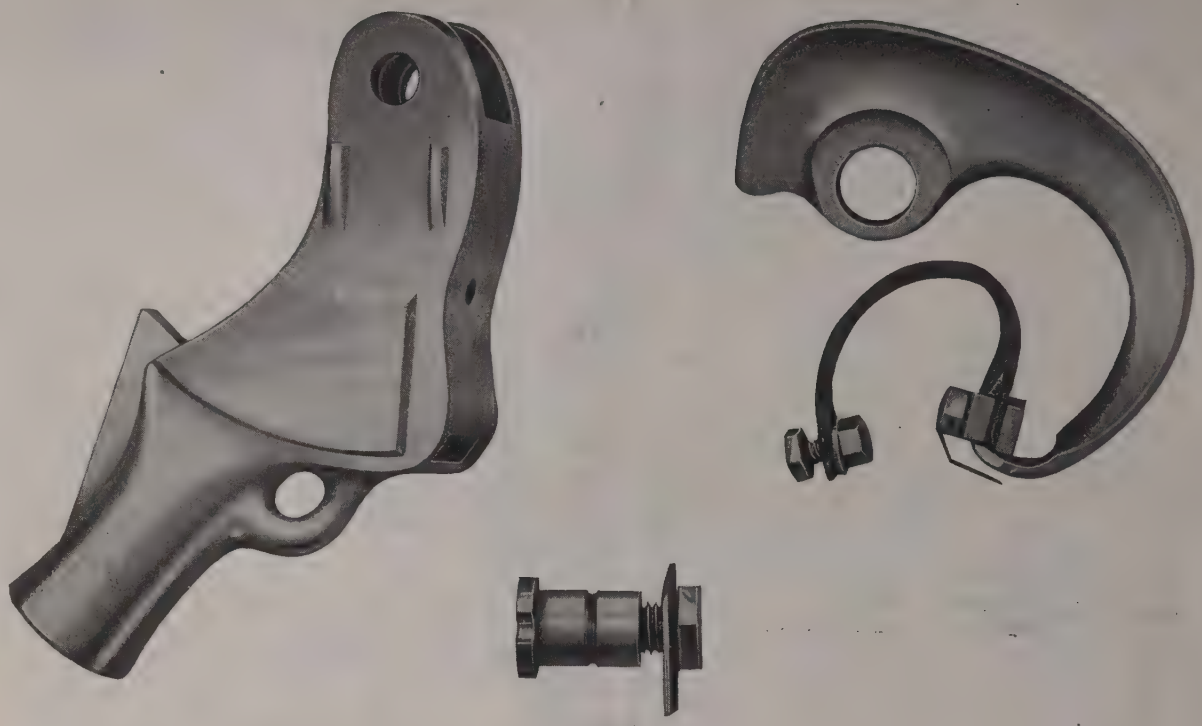
TO withstand the stress and strains of high speed and heavy haulage, the sudden shocks from brake-shoes, track curvatures and crossovers—to withstand these conditions and reduce upkeep expense, specify Davis One-wear Steel Wheels.

American Steel Foundries

1100 McCormick Building

CHICAGO

DAVIS STEEL WHEELS



Simple—Still Highly Efficient

SIMPLICITY is what we are all striving to obtain. In order to get this we do not want to overlook the fundamental principles and sacrifice efficiency.

The Miller Trolley Shoe is a step in advance of other current collecting devices in that it is the most efficient and the simplest. Combining these two points to such a high degree was our original aim and so well have we succeeded that today the Miller Trolley Shoe is in a class by itself.

The sliding type of contact has proven its superiority over other types and requires much less attention.

Let us show you what we have done for numerous other roads. Remember Miller Trolley Shoes work equally well on both city and suburban service. Write for details today.

Miller Trolley Shoe Company, West Newton, Mass.

SPECIAL REPRESENTATIVE: Holden & White, Inc., Chicago

EASTERN REPRESENTATIVE: National Railway Appliance Co., New York

SALES REPRESENTATIVES:

Alfred Connor, Denver, Colo.
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F. F. Bodler, San Francisco, Calif.
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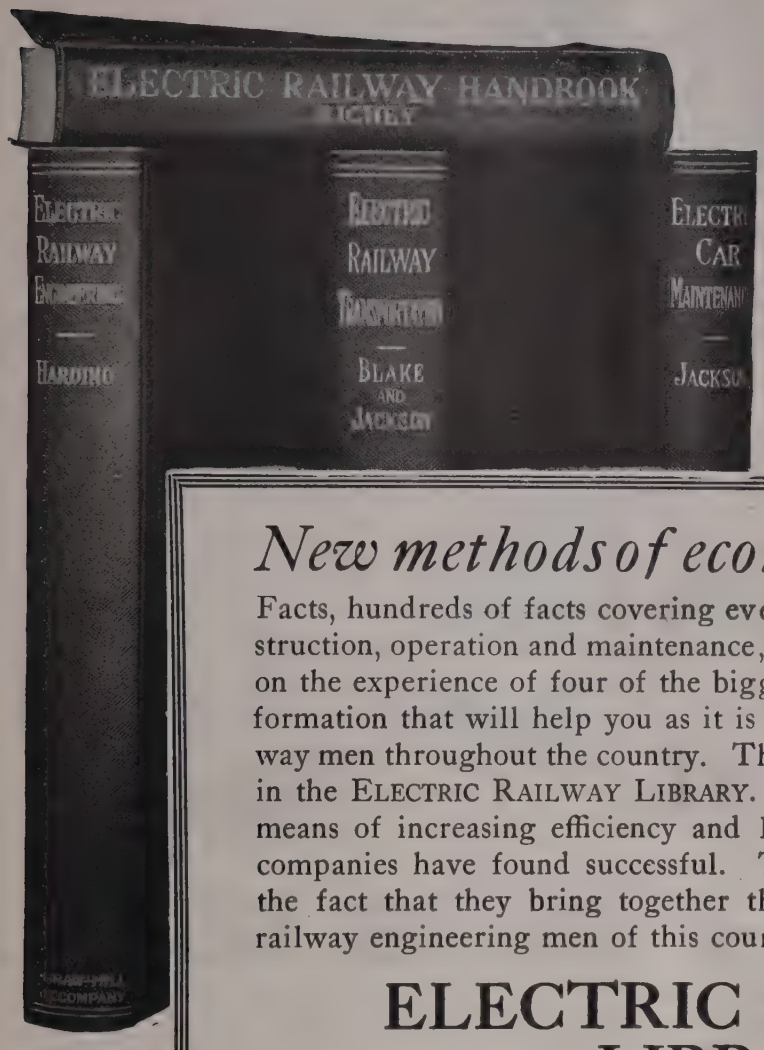
S. I. Wailes, Los Angeles, Calif.
W. F. McKenney, Portland, Oregon

A timely help for electric railway executives



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New methods of economy demand facts

Facts, hundreds of facts covering every branch of electric railway construction, operation and maintenance, modern, reliable information based on the experience of four of the biggest electric railway specialists, information that will help you as it is helping hundreds of electric railway men throughout the country. This is the kind of material presented in the ELECTRIC RAILWAY LIBRARY. The four books point out ways and means of increasing efficiency and lowering costs which other railway companies have found successful. The great value of the book lies in the fact that they bring together the cumulative experience of electric railway engineering men of this country.

ELECTRIC RAILWAY LIBRARY

4 VOLUMES, $15.50, PAYABLE IN FIVE INSTALLMENTS

ELECTRIC RAILWAY ENGINEERING is a thorough and practical manual of the broader engineering problems. ELECTRICAL RAILWAY TRANSPORTATION covers the business side of the subject—the relation of traffic to profits. It is packed full of priceless information on traffic conditions, their causes and their relations to electric railway efficiency. ELECTRIC CAR MAINTENANCE has saved money for hundreds of lines. It is a complete treatment of this special subject. The ELECTRIC RAILWAY HANDBOOK is a pocket encyclopedia of electric railway construction, operation and maintenance. It is the Webster of the industry.

We are so convinced of the value of this library that we invite you to use the books for ten days without charge. You simply agree to return the books, postpaid, within 10 days of their receipt or to remit $3.50 and $3.00 each month thereafter for 4 months until the total price of $15.50 is paid. Use the coupon.

McGRAW-HILL BOOK CO., Inc.

239 West 39th Street, New York

Free Examination Coupon

McGraw-Hill Book Co., Inc., 239 West 39th Street, New York.

You may send me the Electric Railway Library for my inspection. If the books prove satisfactory, I will send $3.50 in 10 days and $3.00 per month for four months—until I have paid the price of the books—$15.50. If the books are not what I want I agree to return them postpaid within 10 days of receipt.

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E. 12-27-19

CITIZENS NATIONAL BANK
For Men And Young Men of the Minute
THE NEWER FASHIONS OFFER A LARGER VARIETY OF MODELS AND FABRICS THAN EVER. SEE OUR COMPREHENSIVE DISPLAY OF THE CORRECT INDEX
GEORGE MACKIE & CO.
119 MAIN STREET

The Triangle of COLLIER SERVICE

A Service which nets the advertiser satisfactory returns on his advertising investment and assures the electric railway an unfailing income from its car card space.

Since it costs hundreds of dollars to conceive, design and print a car card which produces results, and—

Since local advertising contractors cannot afford to give a service which makes car card advertising a paying proposition to the advertiser—

An organization as wide in scope as COLLIER SERVICE has been created to meet this requirement and a continuous source of revenue is thus assured to the railway company.

Barron G. Collier INCORPORATED

Candler Building

220 West 42nd Street, New York City

Metal Tickets Save the Day
—*Millions now in use*

Until necessity forced the retirement of the old 5-cent fare standard, there was no need for ticket fares except on some properties where they were required by ordinance. With the coming of odd-cent and fractional-cent fares the use of tickets was imperative. Paper tickets could not be properly accounted for, and the situation had to be met with *metal tokens which could be registered the same as any coin in a fare-box.*

That *results have been entirely satisfactory* was vouched for by numerous railway men at the recent Atlantic City Convention.

Among the ***Advantages cited for Metal Tickets*** *were these:*

Their use permits charging fares involving fractions of a cent and the transfer from one fare schedule to another without change of coin.

Amount of cash handled by conductors is reduced to a minimum and the chance for errors or dishonesty is reduced to a minimum.

Company receives a large portion of its receipts prior to time service is rendered to customer.

Their use tends to decrease congestion in loading because change making is not required, and this decreases length of stop and makes for faster schedules; also permits conductors to give more attention to other duties.

Their use tends to encourage riding habit because experience shows it easier to part with a ticket than to "break" another coin.

It is easier to examine metal tickets than multiple fare units on the inspection plate of fare-box.

Metal tickets outlast any other tickets and it is difficult to counterfeit them.

Any fare value may be placed on a metal ticket, and the modern type of fare-box will record the exact amount represented.

The work of accounting department is simplified.

We have been furnishing metal tickets to our customers for several years past.

New orders for additional tickets *by the million* are being received every week.

We will be pleased to give the names of these companies and to quote prices upon request.

JOHNSON FARE BOX COMPANY

Jackson Boulevard and Robey Street, Chicago
50 East 42nd Street, New York

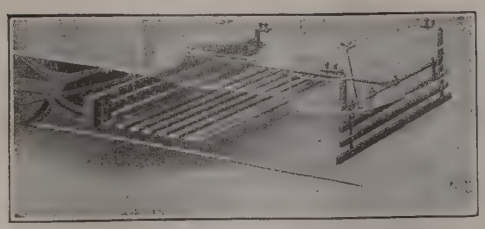
H-B Salvavidas en Mantanzas, Cuba

Meaning

H-B Life Guards in Mantanzas, Cuba

Here is a car of the Ferrocarril Electrico de Mantanzas, S. A. (Electric Railway of Mantanzas, S. A.)
Note how close the cars run to the sidewalk. Accidents are bound to occur on this line.
But note also the H-B Life Guard,—ready to protect any careless or unfortunate person from being run over by the car wheels. . . . H-B Life Guards operate automatically and instantly.
All the cars of the Ferrocarril Electrico de Mantanzas, S. A. are H-B equipped. They have front end accidents—but few of them are serious. H-B Life Guards form a "Barrier of Safety" between the fallen pedestrian and the car wheels.

"Barrier of Safety" between the fallen pedestrian and the car wheels



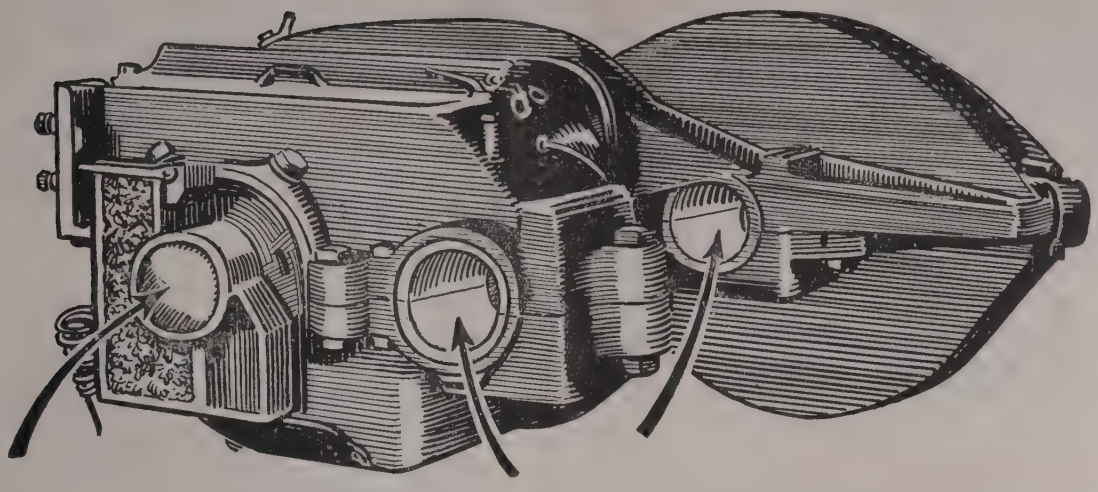
The Consolidated Car Fender Co.

Providence, R. I.

General Sales Agent

Wendell & MacDuffie Co.

61 Broadway, New York



Why Armature and Axle Bearings Get Hot

Armature and Axle Bearing troubles are traceable in more cases than a good many men realize to poor quality packing used.

Franklin Perfection
Journal Box Packing

can be used in Armature and Axle Bearing service equally as well as in Journal Box service.

As long as there is oil in the chambers The "Franklin Perfection" feeds your Motor and Axle Bearings the proper amount of lubricant to keep them running smooth and cool.

The Armature is the most expensive part of a motor. A hot Armature Bearing usually means the entire rewinding of its Armature. By preventing the hot bearings endless expense and trouble is saved.

Ask us for our Text Book on Packings, also a sample of "Franklin Perfection." You may find both a valuable aid to savings in maintenance.

The Franklin Manufacturing Company
Franklin, Pa.

Cambria
Rolled Steel Wheels

It is seldom necessary to argue the superiority of rolled steel wheels over other types in these days. That they give superior service, have a much longer life and require less attention are recognized facts.

Cambria Rolled Steel Wheels are made for all classes of electric railway service, including street, interurban elevated and subway.

Send us your inquires.
We'll be pleased to quote you.

MIDVALE STEEL AND ORDNANCE COMPANY
CAMBRIA STEEL COMPANY

General Sales Office, WIDENER BUILDING, PHILADELPHIA, PA.

DISTRICT SALES OFFICES

ATLANTA BOSTON CHICAGO CINCINNATI CLEVELAND DETROIT NEW YORK PHILADELPHIA
PITTSBURGH SAN FRANCISCO SALT LAKE CITY SEATTLE ST. LOUIS

CONSOLIDATED STEEL CORPORATION, 165 Broadway, New York
is the sole exporter of our commercial products.
Address all export inquiries to them.

Series Number 25-I

50 Years of Galena Service

FOR the past two years we have been reflecting to the electric railway industry through our advertising pages in the Journal, the tremendous effects upon modern commerce and civilization that history shows have been wrought by constant progress in the art of transportation.

These historical references have been particularly illuminating in showing the tremendous developments which have taken place during the transition from animal power to steam and electric power.

The great bulk of this progress has occurred during the last sixty years and for 50 of those years Galena Oils and Galena Service have been constantly "on the job."

It was in 1869 that this company first put on the market a lubricating oil carrying in perfect suspension a base of oxide of lead. This is still today as it was then an exclusive process of this company. The advantage of it is to fill in the microscopical irregularities in the bearing and thus provide a perfectly smooth surface of long wearing quality.

This, at that time, new and revolutionary idea was merely the first of the long line of progressive improvements in lubrication that have through 50 years made "Galena" Oils and Service synonymous with "better lubrication at lower cost."

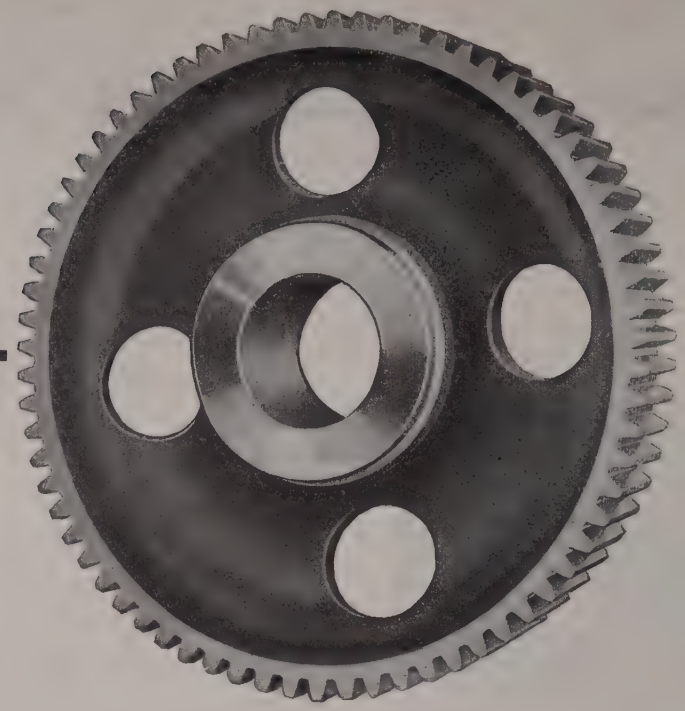
GALENA QUALITY

Galena-Signal Oil Company, Franklin, Pa.

New York **Franklin, Pa.** Chicago

Works at Franklin, Pa. Parkersburg, W. Va. Whiting, Ind. St. Louis, Mo.
Bayway, N. J. Toronto, Can. Rouen, France

Offices in all Principal Cities of U. S.
London Buenos Aires Paris



Gearing that helps in the fight against rising costs

Gears that can be depended upon for heavy duty—that do not break under sudden shocks or severe strain—gears that will wear long after other grades have been scrapped—such gears are

Grade M

The More Miles-per-Dollar Gearing

It is true economy to purchase a quality of gearing that will mean a smaller cost per year of operation. There is no doubt of this with Grade M. Their "more miles per dollar" service has been amply demonstrated by the experience of many users over a period of years. Nearly every large electric railway in the United States is an enthusiastic user of Grade M. How much longer can YOUR road afford to be without them?

Send for bulletin 44419

General Electric Company

General Office
Schenectady, N. Y.

Sales Offices in all large cities

40-111

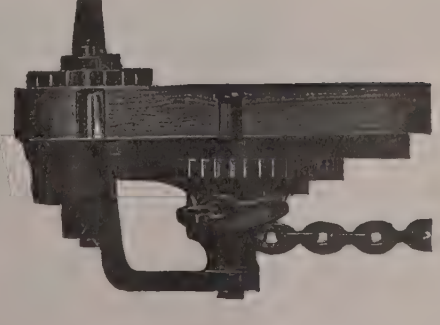
A Peacock for Every Need

NO matter what weight type or style of car you are now using we have a Peacock Brake that we can thoroughly guarantee and recommend to be strong—positive and instantaneous in action.

Once a user always a user. Many motormen prefer to use the Peacock instead of the air even when the cars are equipped with Air. Numerous Railways equip their roads with Peacocks instead of air brakes, but no matter whether they are used as the main brake or the reserve the same excellent results will be obtained.

The list of Peacock users is growing steadily all because of the results obtained from their use.

We know what they will do, so why not let us show you?



National Brake Co.

Buffalo, N. Y.

Bankers and Engineers

Ford, Bacon & Davis,
Engineers.
115 BROADWAY
New Orleans NEW YORK San Francisco

THE J. G. WHITE COMPANIES
ENGINEERS CONTRACTORS
FINANCIERS OPERATORS
43 EXCHANGE PLACE . . NEW YORK

STONE & WEBSTER
Industrial Plants and Buildings, Steam Power Stations, Water Power Developments, Substations, Gas Plants, Transmission Lines, Electric and Steam Railroad Work.
NEW YORK BOSTON CHICAGO

JOHN A. BEELER
OPERATING AND RATE INVESTIGATIONS
TRAFFIC SURVEYS AND SCHEDULES
MANAGEMENT - CONSTRUCTION - APPRAISALS
DIFFICULT WORK EXECUTED
52 VANDERBILT AVE., NEW YORK

KELLY, COOKE & COMPANY
Engineers
424 CHESTNUT STREET
PHILADELPHIA

WOODMANSEE & DAVIDSON ENGINEERING CO.
ENGINEERS
MILWAUKEE
First National Bank Bldg.
CHICAGO
784 Continental & Commercial National Bank Bldg.

THE ARNOLD COMPANY
ENGINEERS—CONSTRUCTORS
ELECTRICAL—CIVIL—MECHANICAL
105 South La Salle Street
CHICAGO

ENGELHARDT W. HOLST
Electric Railway Engineer
Appraisals, Financing, Reorganizations
683 Atlantic Ave., Boston, Mass.

ALBERT S. RICHEY
ELECTRIC RAILWAY ENGINEER
WORCESTER POLYTECHNIC INSTITUTE
WORCESTER, MASSACHUSETTS

E. W. Clark & Co., Management Corporation
Engineers
Power Plants, Electric Power Transmission and Industrial Application
Huntington Bank Building, Columbus, Ohio

DWIGHT P. ROBINSON and COMPANY
Incorporated
Design — Construct — Finance — Manage
UTILITIES INDUSTRIALS
61 Broadway, New York

ROBERT M. FEUSTEL
CONSULTING ENGINEER
Rate, Traffic and Reorganization Investigations
Fort Wayne, Indiana

A. L. DRUM & COMPANY
CONSULTING AND CONSTRUCTING ENGINEERS
VALUATIONS AND FINANCIAL REPORTS
CONSTRUCTION AND MANAGEMENT
OF ELECTRIC RAILWAYS
76 West Monroe St. CHICAGO, ILL.

REPUBLIC ENGINEERS, INC.
CONSULTING AND CONSTRUCTING ENGINEERS
Valuations Reports Investigations
Designs Construction Management
60 BROADWAY, NEW YORK
CLEVELAND, OHIO
Illuminating Bldg.
YOUNGSTOWN, OHIO
Mahoning Bank Bldg.

GARDNER F. WELLS
CONSULTING ENGINEER
PUBLIC UTILITIES
FINANCE OPERATION
SUPERVISION OF CONSTRUCTION
43 Cedar Street, New York

The Most Successful Men in the Electric Railway Industry read the
ELECTRIC RAILWAY JOURNAL
Every Week

AMERICAN BRIDGE COMPANY
HUDSON TERMINAL-30 CHURCH STREET, NEW YORK

Manufacturers of Steel Structures of all classes particularly BRIDGES AND BUILDINGS

Sales Offices

NEW YORK, N. Y.	30 Church Street	St. Louis, Mo.	Third National Bank Building
Philadelphia, Pa.	Widener Building	Denver, Colo.	First National Bank Building
Boston, Mass.	John Hancock Building	Salt Lake City, Utah	Walker Bank Building
Baltimore, Md.	Continental Trust Building	Duluth, Minn.	Wolvin Building
PITTSBURGH, PA.	Frick Building	Minneapolis, Minn.	7th Ave. & 2nd St., S. E.
Buffalo, N. Y.	Marine National Bank		
Cincinnati, Ohio	Union Trust Building	*Pacific Coast Representative:*	
Atlanta, Ga.	Candler Building	U. S. Steel Products Co., Pacific Coast Dept.	
Cleveland, Ohio	Guardian Building	San Francisco, Cal.	Rialto Building
Detroit, Mich.	Beecher Ave. & M. C. R. R.	Portland, Ore.	Selling Building
CHICAGO, ILL.	208 South La Salle Street	Seattle, Wash.	4th Ave. So., Cor. Conn. St.

Export Representative: United States Steel Products Co., 30 Church St., N. Y.

Steam and Electric Railway "Checking"

Complicated interurban and Ohmer Fare Register work a specialty. Confidential investigations. Write for our proposition, "Prosecuting Dishonest Conductors." We maintain a special department thoroughly equipped for handling all strikes.

The Industrial Protective Company
Suite 804-5-6 Mutual Home Bldg., Dayton, Ohio

The result of the best practice in electric railway work is recorded every week in the Electric Railway Journal.

H. M. Byllesby & Company, Inc.

NEW YORK Trinity Bldg. — CHICAGO No. 208 So. La Salle St. — TACOMA Washington

Purchase, Finance, Construct and Operate Electric Light, Gas, Street Railway and Water Power Properties
Examinations and Reports — Utility Securities Bought and Sold

C. E. SMITH & CO.
Consulting Engineers
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Investigations, Reports, Appraisals, Expert Testimony, Bridge and Structural Work, Railway Problems, Electrification, Grade Crossing Elimination, Foundations, Highways, Docks, Water Supply, River and Flood Protection, Drainage and Sanitation, Power Plants, Naval Architecture.

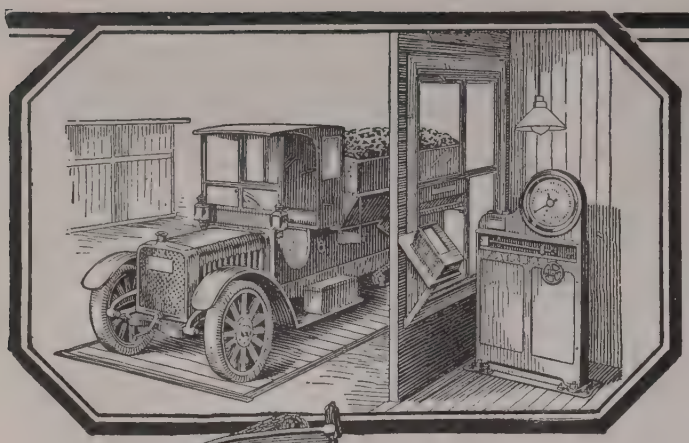
P&H CEDAR POLES
Where Service Counts
PAGE & HILL COMPANY
Minneapolis Chicago New York Kansas City Houston

ELECTRICAL TESTING LABORATORIES
Electrical, Photometrical and Mechanical Testing.
80th Street and East End Ave., New York, N. Y.

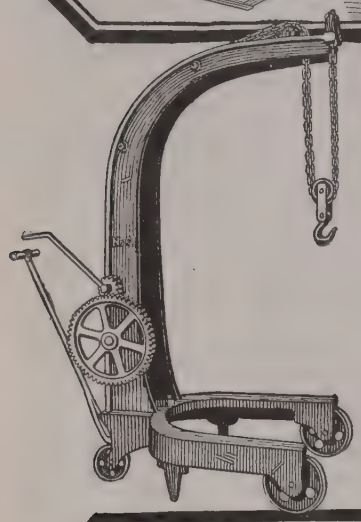
Scofield Engineering Co. Consulting Engineers PHILADELPHIA, PA.
POWER STATIONS — GAS WORKS
HYDRAULIC DEVELOPMENTS — ELECTRIC RAILWAYS

THE P. EDW. WISH SERVICE
Suite 1710 Park Row Bldg., New York — DETECTIVES — *Suite* 1102 Board of Trade Bldg., Boston

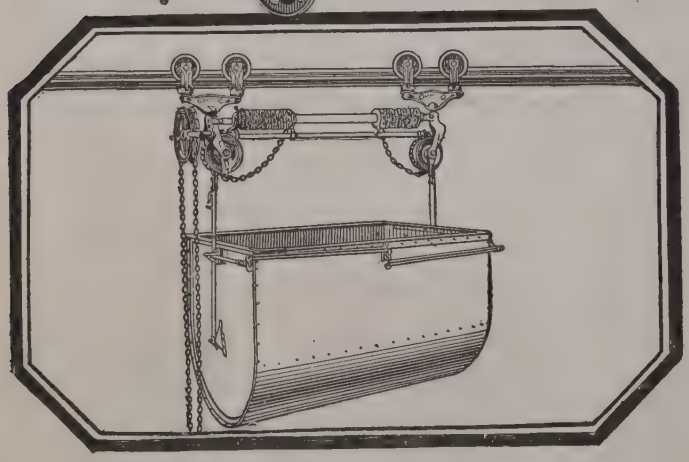
When writing the advertiser for information or prices, a mention of the Electric Railway Journal would be appreciated.



Auto Truck Scale



O e man does the work of fo r if e uses a Canton Crane



The Louden Conveyors save floor space and are easy to push

ACCURATE

The Basis of

EVERY charge for coal, supplies or freight involves a weighing operation. Accurate figures—not guesswork—are essential to the confidence you want to build in your patrons' minds.

Accurate weights—the sort that prevent claims and losses—are a certainty when you use Fairbanks Scales. On a giant 800-ton track scale or a little counter scale, you read the weight exactly, because every weighing device, large or small, bears "The Fairbanks Company O.K." For everything you want to weigh—whether on freight cars, automobile trucks, overhead trolleys, hand trucks, in bulk, or by hand—there is a Fairbanks Scale. Dial scales give the weight direct in figures up to full capacity—many times the range of the dial alone.

In Fairbanks Branch Warehouses there are repair shops where Fairbanks Scales, after years of service, are restored to their original accuracy. Thus after-service

The **FAIRBANKS** *Company*

O.K.

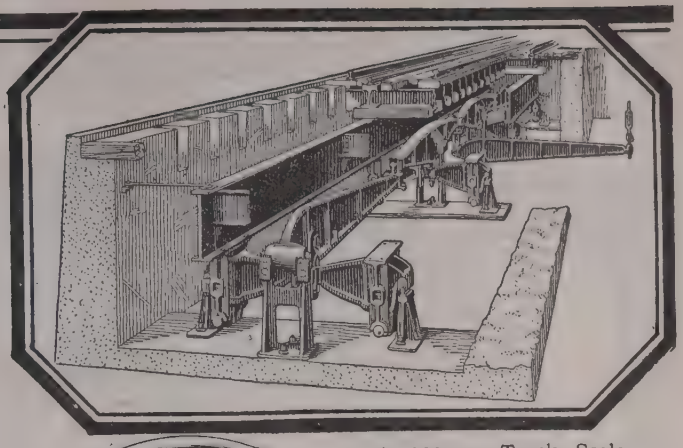
TRUCKS & WHEELBARROWS ENGINES & PUMPS AUTOMOBILE & SERVICE STATION EQUIPMENT

WEIGHTS
Your Records

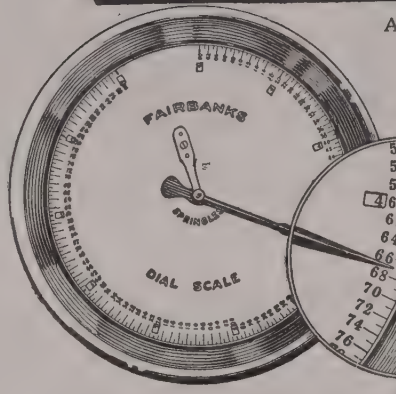
maintains "The Fairbanks Company O. K."

Many other appliances for freight and materials handling can be bought under the "Fairbanks Company O. K." Trucks, wheelbarrows, Louden Overhead Carriers, Canton Portable Cranes, shovels, crowbars, chain blocks, conveyor systems—these are just a few of the lines carried in stock by each of the 22 Fairbanks Branch Houses. Their reserves remove the need for large stores of your own.

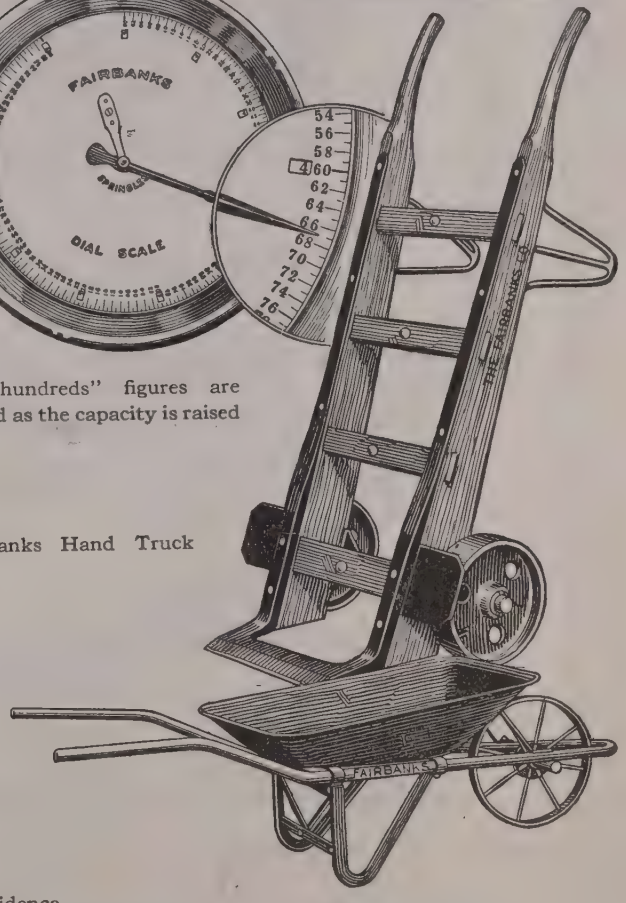
Rapid, free movement is the only remedy for congestion. Speedy handling is the nation's great need. We can help—ask us how!



A 300-ton Track Scale



The "hundreds" figures are changed as the capacity is raised



Fairbanks Hand Truck

Steel Wheelbarrow —tubular handles

THE FAIRBANKS COMPANY
Administrative Offices: NEW YORK

BRANCH OFFICES:

Albany, Baltimore, Birmingham, Boston, Bridgeport, Buffalo, Chicago, Detroit, Utica, Hartford, Newark, New Orleans, New York, Paterson, Philadelphia, Pittsburgh, Providence, Washington, Rochester, Scranton, St. Louis, Syracuse

Havana, Cuba *London, Eng.* *Birmingham, Eng.*
Glasgow, Scotland *Paris, France*

The FAIRBANKS Company

O.K.

MILL, MINE & RAILWAY SUPPLIES SCALES VALVES POWER TRANSMISSION MACHINE TOOLS

FACTORY FOR JOHN B. SEMPLE & COMPANY, STOOPS FERRY, PA.

GETTING *THE* CONTRACTOR IS MORE IMPORTANT THAN GETTING *A* CONTRACT!

Your plant extension must comprehend something more than the mere letting of a contract if it is to add to the efficiency of your operations as well as to their scope.

If you will let us confer with you on the matter, it is almost certain that we can evolve from an analysis of *your problems* and *our experience,* suggestions which you will find it beneficial to adopt.

All that we ask is a conference.

The contract will take care of itself.

Our Advice is as Good as Our Service

THOMPSON-STARRETT COMPANY

INDUSTRIAL CONSTRUCTION

NEW YORK

CHICAGO DETROIT PITTSBURGH

HEAVY FORGINGS

THE STANDARD FORGINGS COMPANY

OFFICES: RAILWAY EXCHANGE BLDG.
CHICAGO

BRANCHES:

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ST. LOUIS....COMMONWEALTH TRUST BLDG.
MILWAUKEE..FIRST NATIONAL BANK BLDG.
DENVER.....1617 BLAKE STREET
LOS ANGELES.....241-243 LOS ANGELES ST.
SAN FRANCISCO.....69-71 FIRST ST.
PORTLAND.....46-48 FRONT ST.
SALT LAKE CITY..117 W. SECOND SOUTH ST.
HOUGHTON, MICH.....96 SHELDON ST.

Shafts
Connecting
Rods
and
Heavy Forgings
for
Machinery
Heavy Forgings
in Other Lines

Car Axles
Tender Axles
Truck Axles
Driving Axles
Trailer Axles
Side Rods
Piston Rods
Crank Pins
Center Plates
Journal Wedges

"STANDARD"

Steel Tires
Steel Tired Wheels
Solid Rolled Steel Wheels
O. H. Steel and Malleable Iron Castings
Solid Forged Gear Blanks

"The 'Standard' Brand on your material

STANDARD STEEL

General

500 North Broad St.,

Chicago St. Louis Havana, Cuba Richmond San Francisco

"STANDARD"

Steel Forgings Iron Forgings

Forged and Rolled Steel

Pipe Flanges

Ring Dies

Rings

Roll Shells Steel Springs

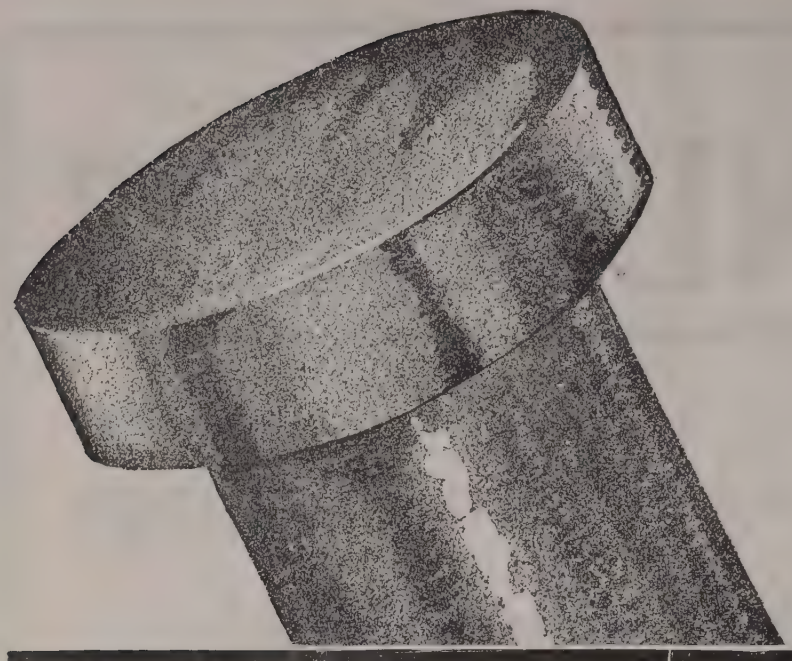
is an assurance of eventual economy." ⚓S⚓ BRAND

WORKS CO.

Offices:

Philadelphia, Pa.

New York Monterey, Mex. Mexico City London, England Paris, France



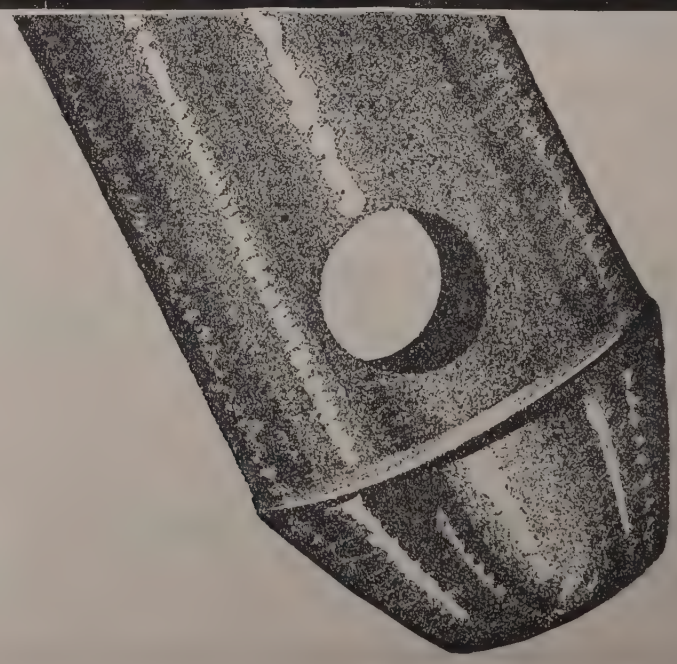
Safety Cars are Safer when

BOYERIZED

Brake Pins are Used

When your brakes are held together by a brake pin that will not break and shows practically no wear after 200,000 miles use, your Safety cars become Safer.

This is what the Boyerized Case Hardened Brake Pin will do. Let us send you samples so you can see for yourself.



ELECTRIC RAILWAY SUPPLIES

Bemis Car Truck Company

SPRINGFIELD, MASS.

Decide To Name It "Increased"

In these days everybody is well acquainted with the adjective used to modify production, fares and prices. It is the word, increased. Why not become still better acquainted with it and use it when you speak of Revenue, by getting Light Weight One Man Cars, built in the Quality Shops. We built the first one years ago. This is the age of Progress, so they're mighty good cars now.

St Louis Car Company

St Louis Mo.

An Up-to-date Railway

Above is a reproduction of the General Electric Co. advertisement which appeared in colors on the back cover of *Electric Railway Journal,* September 27th issue.

It shows fifteen modern cars recently placed into operation at Oshkosh, Wisconsin, by the Eastern Wisconsin Electric Co.

The Eastern Wisconsin Electric Co. realizes that the best is the cheapest in the end. That's why they bought

ACME (NESTABLE) Corrugated CULVERTS

Anti-Corrosive No-Co-Ro Metal Galvanized

to properly take care of their drainage problems. They wanted culverts like these new cars—safe and durable.

"ACMES" are safe because the deep corrugations and heavy gauge "No-Co-Ro" Metal make them really stronger than necessary. They will hold up under the heaviest traffic.

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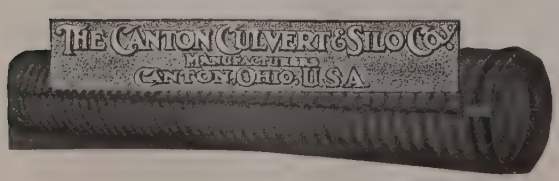

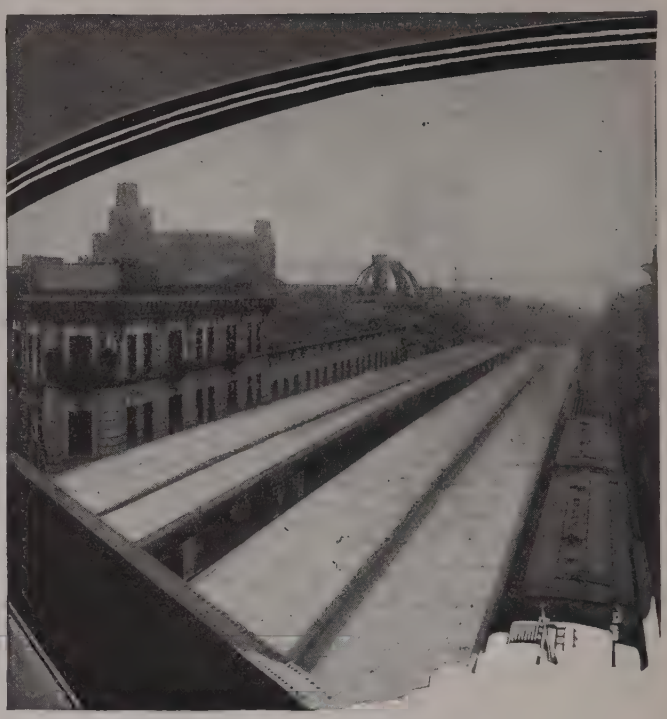

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JOHNS-MANVILLE Transite Asbestos Wood is an absolutely fireproof building material that is valuable not only for paneling, doors and partitions, but also for roofs.

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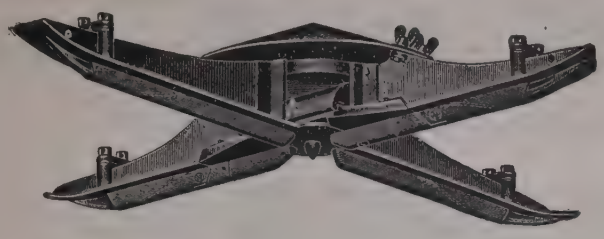

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ANDERSON Sheet Steel Insulated Crossing Round Top Straight Line Suspension

Your overhead is completely insured by Anderson Line material.

The Sheet Steel Insulated Crossing is stronger yet 25% lighter than other crossings. It is made of the best homogeneous sheet steel and fitted with renewable insulated runways to insure long life under heavy service.

Anderson Round Top Straight Line Suspension has drop forged steel studs made with outriggers turned up or down.

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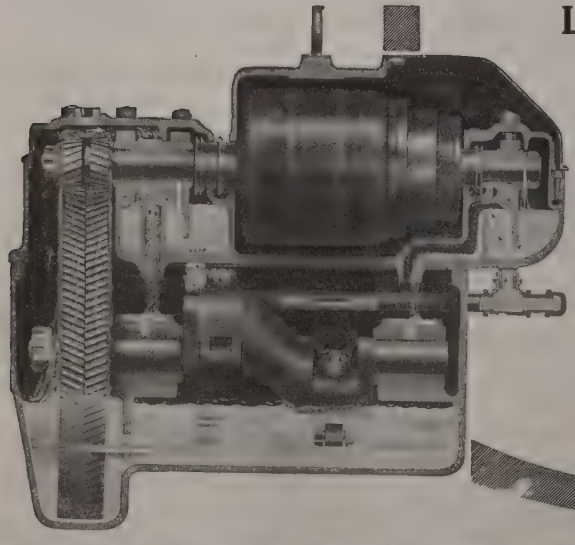

The thoroughness with which this important detail has been worked out is an index to the complete design and careful construction of these improved compressors for air brake equipments.

Let us tell you more about them. Send for Bulletin 1525-A.

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IT'S THE CONSTANT "LITTLE REPAIRS" THAT BUILD UP EXCESSIVE MAINTENANCE COSTS.

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CYPRESS

"THE WOOD ETERNAL"

not only on new construction, but on all replacement work.

All-heart Cypress comes nearest

to being "decay proof" of any lumber in the market suitable for railway use.

Several of the largest railway companies in the country have found the use of Cypress a paying investment.

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The extinguishing agent is Castle Liquid approved for Government use and used by leading Corporations, Railroads and Governmental Departments.

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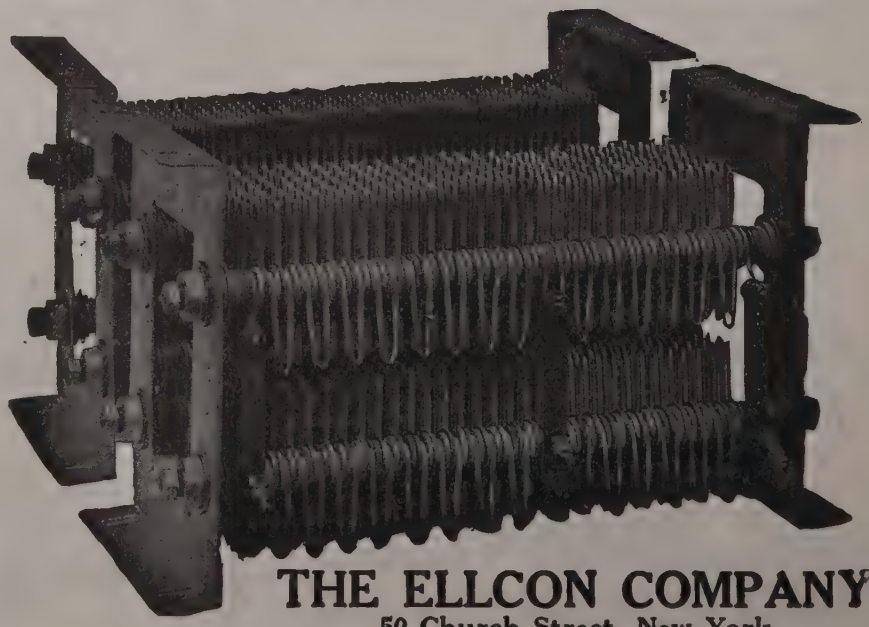

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Five conveniently located warehouses make steel sections in common use immediately available. Carnegie Warehouse Service will meet your needs quickly and efficiently. A monthly stock list is prepared and mailed to our customers.

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Tubular Steel Poles cost 50 per cent. more than Bates Steel Poles, yet Bates Poles are 100 per cent. stronger—will last 100 per cent. longer, cover a much broader range of adaptability and are much more artistic than Tubular Poles. Ask us to verify these facts.

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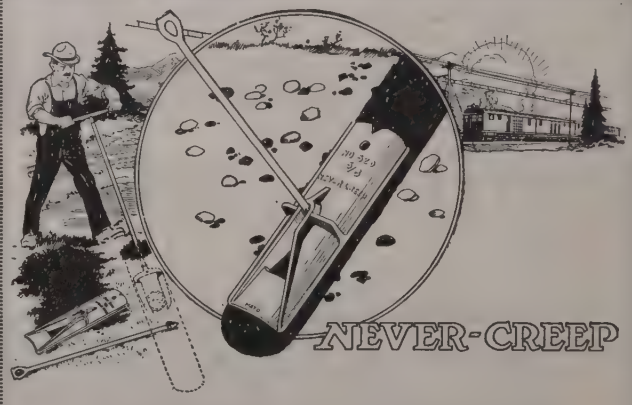

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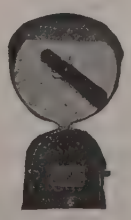

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Can't we launch *you* on *your* initial installment?

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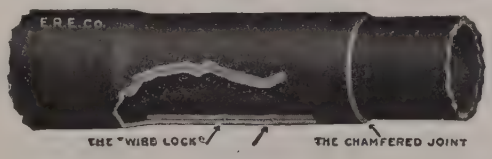

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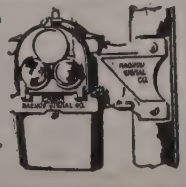

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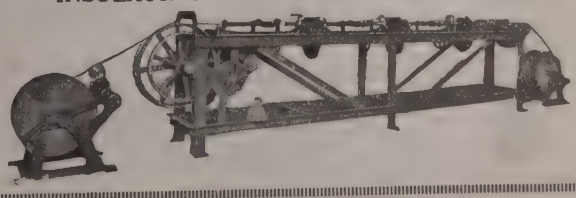


Williams' "Agrippa" Tool Holders

IN these days of heavy cuts and high speeds, tools must be so designed and made as to be absolutely reliable, if satisfactory serviec is to be rendered.

Williams' "Agrippa" Tool Holders have established a record of economy for quality and quantity production because they are thoroughly dependable.

Carried in stock for Turning, Boring, Planing, Threading, Knurling, Cutting-off and Side Work and guaranteed for the hardest kind of service.

New Catalog on request.

J. H. Williams & Co.

"The Drop-Forging People"
143 Richards St., Brooklyn, N. Y.

143 So. Clinton St.
Chicago, Ill.

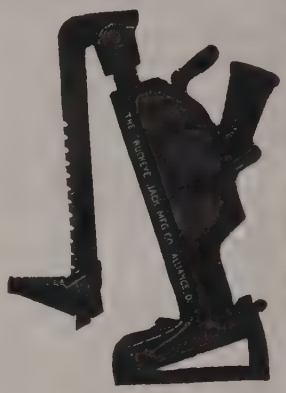
143 Vulcan St.
Buffalo, N. Y.

Full Power with High or Lower Adjustment

Many emergencies requiring a powerful jack present a difficulty in bringing the jack to bear on the load.

Buckeye Emergency Jack No. 239 Special

saves time, strength and trouble. The many positions to which it is adjustable easily solve perplexing lifting problems.



Full details in our catalog. Write for it.

The Buckeye Jack Mfg. Co.
Alliance, Ohio

NILES-BEMENT-POND CO.

111 BROADWAY, NEW YORK

MACHINE TOOLS

For Electric Railway Repair Shops

Axle Lathes
Wheel Presses
Shapers, Drills
Slotters, Planers
Steam Hammers
Electric Travelling Cranes

Send for Catalogs

The Big Three

D & W Fuses
Deltabeston Wire
D & W Oil Fuse Cutouts

D & W Fuse Co., Providence, R. I.

Our new K-35-36 Triggerlock Reversible Controller Finger is the best ever made. You cannot afford to be without them if you use these controllers.

They have our standard reversible and interchangeable tips.

Our reverse fingers for these controllers are great time and money savers.

Order some, and after testing them you would never use any other kind.

A sample finger will be sent if you write for it of any type.

Triggerlock Reversible Controller Finger

814-18 Bath Ave., Niagara Falls, N. Y.
557 King St. West, Toronto, Canada

LET

TOLEDO CRANES LIFT YOUR LOAD

Get in touch with us

TOLEDO BRIDGE & CRANE CO.
TOLEDO, OHIO

New York Office, 52 Broadway
Philadelphia Office, 2013 Market St.
Pittsburgh Office, 203 Oliver Bldg.
Cleveland Office, 725 Citizens Bldg.
Chicago Office, 549 Washington Blvd.
San Francisco Office, Rialto Bldg.

A Great Improvement in Coin Changers

The McGill HIGH-SPEED Lever-operated Changer is now built with a gear movement instead of a curved cam. If desired a fifth barrel can be attached, which will meet all practical requirements of fare collections. The new machine can be supplied to eject quarters, dimes, nickels, single pennies, or 4 or 5 pennies at one time. Also 4 nickels at a time; also metal checks for fare box service.

Write for description.

McGill Ticket Punch Co.
542 W. Harrison St.
CHICAGO

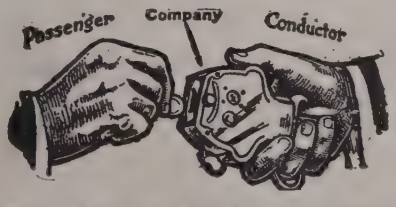
INTERNATIONAL FARE REGISTER

Type R-10
Single Register

International Fare Registers. Single registers, round and square; double registers, duplex counters, car fittings, foot-operating devices for single and double registers. Exclusive selling agents for Heeren enamel cap and coat badges.

The International Register Co.
15 South Throop Street, Chicago

DIRECT AUTOMATIC REGISTRATION BY THE PASSENGER



ROOKE AUTOMATIC REGISTER CO.
PROVIDENCE, R. I.

THE
CLEVELAND

Is the practical Fare Box for

Service at Cost

Let us tell you why

The Cleveland Fare Box Co.
Cleveland, Ohio
Canadian Branch: Preston, Ont.

RAILWAY UTILITY COMPANY

Sole Manufacturers

"Honeycomb" and "Round Jet" Ventilators

for Monitor and Arch Roof Cars, and all classes of buildings

Also Electric Thermometer Control

of Car Temperatures.

Write for Catalogue

141-151 West 22nd St., Chicago, Ill.
1328 Broadway, New York, N. Y.

Electric Car Heaters

Thermostatic Control. Pneumatic Car Door Operators, Buzzers, Single-Stroke Bells, Starting Signal Lights, Special Resistances.

CONSOLIDATED CAR HEATING CO.
ALBANY NEW YORK CHICAGO

Hale & Kilburn
No. 108-AV Stationary Seat
For One-Man Safety Cars.

The unmatchable H&K Seat beats the world for strength and lightness. Every Safety Car should be equipped with it.

HALE & KILBURN CORPN.

Philadelphia
New York Chicago St. Louis
Detroit Washington Atlanta
Louisville San Francisco Dallas

We Can Cut Your Cost of Heating Current

Write for Thermostatic Control Information

GOLD

ELECTRIC HEATERS Cut Installation and Maintenance Charge.

VENTILATORS Also Ventilate in Stormy Weather.

THERMOSTATS Save Current.

ORIGINATED the use of NON-CORROSIVE Wire for Electric Car Heaters.

ORIGINATED The Ventilated Coil Support.

Let Us Figure on Your Next Requirements.

Gold Car Heating & Lighting Company
17 Battery Place, New York

Heating and Ventilating

Let us demonstrate to you how we can heat and ventilate your cars at the lowest possible cost.

The Cooper Heater Co.
Carlisle, Pa.

Car Heating and Ventilation

is one of the winter problems that you must settle without delay. We can show you how to take care of both, with one equipment.

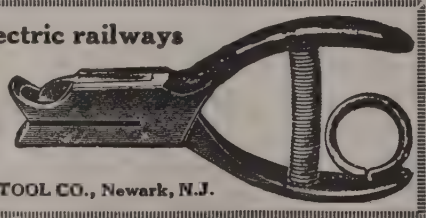
Write for details.

PS HEATERS

THE PETER SMITH HEATER CO.
1725 Mt. Elliott Ave., Detroit, Mich.

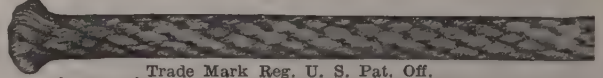
75% of the electric railways use

B-V Punches



Send for Catalog.
BONNEY-VEHSLAGE TOOL CO., Newark, N.J.

Samson Spot Waterproofed Trolley Cord



Trade Mark Reg. U. S. Pat. Off.

Made of extra quality stock, firmly braided and smoothly finished.

Carefully inspected and guaranteed free from flaws.

Samples and information gladly sent

SAMSON CORDAGE WORKS, BOSTON, MASS.

Simplex Jacks

for
Railroads - Contractors - Industries
Automobiles - Pole Pulling and Ordnance

Templeton, Kenly & Co., Ltd.
Established 1893
London Chicago Paris

UNIVERSAL
ANTI-SLIP TREADS

Cars and Station Steps

UNIVERSAL SAFETY TREAD CO.
40 Court St., Boston, Mass.

Drew Motormen's
Safety Mirrors
Eliminate
Accidents

Send for catalogue No. 18

Drew Electric & Manufacturing Co.
1016 E. Michigan St., Indianapolis, Ind.

"It Behooves
You to
Hooverize
Your
Motormen"

We can help you

Write to

The Arthur Power-Saving Recorder Company
2nd National Bank Bldg., New Haven, Conn.

Bound Brook Trolley Wheel Bushings
Give Longer and Better Service

THERE are more Bound Brook (Oil-less) Trolley Wheel Bushings in use today than all other makes combined. That is because Bound Brook Bushings, by virtue of their construction, invariably outlast all other types.

All Genuine Graphited Oil-less Bushings have always been made at Bound Brook, U. S. A.

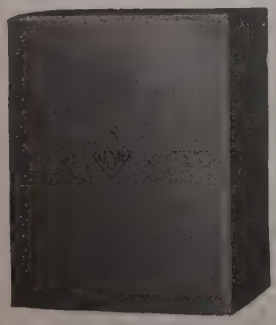
BOUND BROOK OIL-LESS BEARING COMPANY
Bound Brook, New Jersey *Detroit Office: 1723 Ford Bldg.*

Use them in your terminals—

PEREY TURNSTILES
or PASSIMETERS

Faster than the
Ticket Seller

Perey Manufacturing Co., Inc.
30 Church Street, New York City



We specialize in the manufacture of

HIGH GRADE

BRUSHES *for*
RAILWAY MOTORS

and all other types of electrical equipment. All brushes especially designed for the service in which they are to operate and satisfactory performance guaranteed.

Send for specification blanks

THE UNITED STATES GRAPHITE COMPANY
Saginaw, Michigan, U. S. A.

Branch Offices: New York, Pittsburgh, Philadelphia, Birmingham, Chicago, St. Louis, Denver, San Francisco

The "Hycap-Exide" Battery
for
STORAGE BATTERY
STREET CARS

THE ELECTRIC STORAGE BATTERY CO
PHILADELPHIA

The Kalamazoo Trolley Wheels

have always been made of entirely new metal, which accounts for their long life WITHOUT INJURY TO THE WIRE. Do not be misled by statements of large mileage, because a wheel that will run too long will damage the wire. If our catalogue does not show the style you need, write us—the LARGEST EXCLUSIVE TROLLEY WHEEL MAKERS IN THE WORLD.

THE STAR BRASS WORKS
Kalamazoo, Mich., U. S. A.

NOW the ONE-MAN SAFETY CAR has arrived, start right with

Standard Patterns Reinforced Brake Shoes

Pattern No. D-67, 2¼ inches to 2½ inches; wheel treads for narrow heads.
Pattern No. D-87, 2¾ inches to 3 inches; wheel treads for wide heads and use Solid End Plate Brake Heads for Efficiency and Economy.

The American Brake Shoe and Foundry Company
30 Church Street, New York
332 S. Michigan Ave., Chicago Chattanooga, Tenn.

McGuire-Cummings Manufacturing Company

City and Interurban Cars and Trucks, Snow Sweepers and Plows, Express, Combination and Work Cars, Electric Locomotives

General Offices—111 West Monroe St.
CHICAGO

WITH absolute sincerity we make the statement that AJAX BULL BABBITT is
Physically and Chemically the Scientifically Correct Babbitt.
"Most dependable—Most economical."

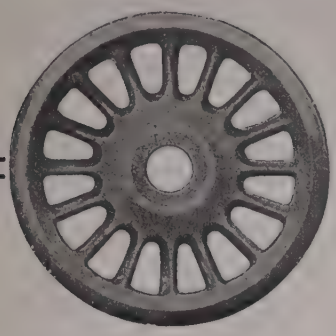
THE AJAX METAL COMPANY *Established* 1880
Main Office and Works: Philadelphia, Pa.
Southern Plant: Birmingham, Ala.

IRVING SAFSTEP

TRADE MARK (PATENTED) REG. U.S. PAT. OFF.
ABSOLUTELY NON-SLIPPING ALWAYS

Write for Catalog 2A28

Irving Iron Works Co.
Long Island City, N.Y., U. S. A.



ICE IS A POOR CONDUCTOR OF POWER—KEEP IT OFF YOUR WIRES

What if the weather is freezing and your trolley wires are coated with ice. Service will continue if there are Nuttall Sleet Wheels or Sleet Scrapers ready to keep your wires clean.

Better order today.

R. D. NUTTALL CO., Pittsburgh, Pa.

Nuttall Helical Gears

A PROVEN SUCCESS

Bayonet Detachable Trolley Harps

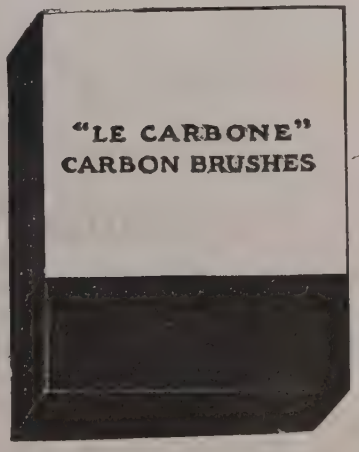
save time, labor, wheels, wire, power, money; keep your cars on schedule time, prevent accidents. Satisfaction guaranteed

Bayonet Trolley Harp Co.
Springfield, Ohio, U. S. A.

VAN DORN COUPLERS

are made for every condition and requirement. M. C. B. Pin and Link, Car and Air, in all sizes and types.

VAN DORN COUPLER CO.
2325 So. Paulina St., Chicago, Ill.



Le Carbone

Carbon Brushes are uniform. They talk for themselves.

W. J. Jeandron
227 Fulton Street
New York City

Pittsburg Office:
636 Wabash Building

Canadian Distributors:
Lyman Tube & Supply Co., Ltd.
Montreal and Toronto

SEARCHLIGHT SECTION

Ads Set in Uniform Style

(Solid in one paragraph, without display)

THREE CENTS A WORD, minimum charge 50 cents an insertion, payable in advance, less 10 per cent. if one payment is made in advance for four continuous insertions—for advertisements under:

Positions Wanted	Vacation Work Wanted
Evening Work Wanted	Salesman Wants Connections

FIVE CENTS A WORD, minimum charge $1.50 an insertion, for advertisement under:

Agencies Wanted	Positions Vacant
Agents Wanted	Partner Wanted
Business Opportunities	Representations Wanted
Desk Room for Rent	Salesmen Wanted
Educational	Patents for Sale
Employment Agencies	Plants for Sale
Desk Room Wanted	Sub-Contracts Wanted
Foreign Business	Work Wanted

Miscellaneous for Sale, for Rent or Want Ads.

THIRTY CENTS A LINE, minimum five lines, for all undisplayed advertisements set with a paragraph for each item or tabulated.

THREE DOLLARS AND SIXTY CENTS AN INCH for advertisements for bids (Official Proposals).

ADVERTISING RATES FOR ELECTRIC RAILWAY JOURNAL

Ads Set in Display Type

(Individual space, within border rules)

Space for these advertisements is sold by the inch. Each page contains 30 inches. The rate per inch is based on the *total* number of inches to be used—that is, the number of inches the advertisement is to occupy multiplied by the number of insertions it is to receive. For instance, a 2-inch advertisement in 2 issues earns the 4-inch rate of $2.90 an inch. A 1-inch space for 4 issues, or a 4-inch space in one issue, also earn the 4-inch rate.

Schedule of Rates

1 to 3 in., $3.00 an in.	15 to 26 in., $2.70 an in.
4 to 7 in., 2.90 an in.	27 to 49 in., 2.60 an in.
8 to 14 in., 2.80 an in.	50 to 99 in., 2.55 an in.

Rates for larger space furnished on request.

In Replying to Ads

DO NOT ENCLOSE original testimonials or anything that you may want returned. State your experience and qualification in as concise and neat a manner as possible and enclose copies of your testimonials.

BE CAREFUL TO PUT ON ENVELOPE, when answering any "blind" ad, the box number in the ad, the name of the paper, and also the local address of office to which reply is sent:

36th St., at 10th Ave.,	New York
935 Real Estate Trust Bldg.,	Philadelphia
533 Leader-News Bldg.,	Cleveland
1570 Old Colony Bldg.,	Chicago
501 Rialto Bldg.,	San Francisco

When Writing Copy

ALLOW FIVE WORDS for the address, if replies are to a box number in care of any of our offices. There is no extra charge for forwarding replies.

TO SIGN YOUR NAME and address to your advertisement begets the confidence of the reader and facilitates receiving replies. You can, however, obviate delay in receiving answers by signing your ad. only with initials (your own or others), care of your home, your office or a post-office box number in your city.

EMPLOYMENT

POSITIONS VACANT

POSITIONS WANTED

POSITIONS VACANT

ROADMASTER required by an electric railway in New York State operating 100 miles of track, mostly in paved city streets. This is a good job and requires a good man who can organize and run several construction and maintenance gangs. State age, experience and salary expected. P-528, Elec. Ry, Journal.

NIGHT foreman wanted for a combined city, suburban and interurban street railway system in midde west ,operating about 110 cars. Must be familiar with both 600 and 1200 volt equipments. Applicant should give age, experience, references and salary expected. P-545, Elec. Ry. Journal, Leader-News Bldg., Cleveland.

POSITIONS WANTED

ELECTRICAL engineer, university graduate, now employed, desires to make a change. Nine years' experience in electric railway power, mechanical and purchasing departments. Can refer to present and past employers and others. PW-544, Elec. Ry. Journal.

WANTED

Street Railway Company having one million dollars receipts, excellent physical and financial condition, desires thoroughly experienced and capable

Vice President

and

Manager

Must be good executive

P543—Electric Railway Journal,
10th Ave. at 36th St., New York City

POSITIONS WANTED

AUDITOR-COMPTROLLER desires position with larger properties; 15 years' experience; salary, $3600; references, present employers. PW-531, Elc. Ry. Journal, Leader-News Bldg., Cleveland.

YOUNG man, 32; seven years' electric railway traffic experience open for engagement after December 15, either electric railway or industrial concern; familiar both freight and passenger tariffs and schedules, and compilation thereof; freight claims, soliciting of business, general correspondence. Now engaged as traveling claim investigator, large system; best of references. PW-536, Elec. Ry. Journal.

WANTED

Shop Superintendent

Thoroughly familiar with the latest methods of manufacturing railway bearings. Reply by mail only to Room 208, 103 Park Avenue, New York City, stating qualifications. All replies considered strictly confidential.

ELECTRICAL ENGINEER

The services of an Electric Railway Engineer, 45 years of age and thoroughly familiar with railway operation, are available, on short notice, to a consulting firm or railway property requiring a man of ability and willing to pay a commensurate salary.

PW-523—Electric Railway Journal
935 Real Estate Trust Bldg., Philadelphia, Pa.

EXECUTIVE POSITION

by a practical and technical man, fifteen years' lighting, power and street railway experience. Excellent references and at present employed.

PW542—Railway Journal
Tenth Ave. at 36th Street, New York City

POSITIONS WANTED

ACCOUNTING executive, expert auditor, available immediately. PW-530, Elec. Ry. Journal.

FOR SALE

Blueprints

Electrical connections, 236 A.C. motor, single, two and three phase. Voltage, cycle, phase changing. 123 D.C. voltage changing, etc. 120 transformer connections. 150 rheostats, controllers, compensators, internal and external. 10 samples A.C. 25c. Particulars free. Charles Chittenden, Dept. J, 3024 Matthews Ave., Kansas City, Mo.

The Searchlight Advertising in This Paper

s read by men whose success depends upon thorough knowledge of means to an end—whether it be the securing of a good second-hand piece of apparatus at a moderate price, or an expert employee.

The Best Proof

of this is the variety of this journal's Searchlight ads. Without a constant and appreciable *demand* for such machinery or services, by its readers, the market-place which these advertisements represent could not exist for any length of time.

—

Are *you* using the Searchlight Section?

WANTED

300 tons of 70-pound A S C E

Relaying Rails

with necessary angle bars or continuous joints to lay same. Three miles of 2 or 3 naught round hard drawn copper trolley wire. All the above material must be in first class condition and ready for delivery not later than April 1st.

W524—Electric Railway Journal
1570 Old Colony Bldg., Chicago, Ill.

FOR SALE

70 K.W., 250 volts, D.C., General Electric

Generator

direct connected to 100 H.P., 720 R.P. M., polyphase

General Electric Motor

complete with switchboard and starting compensator. Price $2500 f. o. b. cars New York City.

SPILGER ELECTRIC CO.
109 Barclay Street, New York City

BOILERS

2 Approximately 85 H.P. Shell boilers in very good condition, 66 in. diam., 16 ft. long, containing 78 3½ tubes, 16 ft. long, each equipped with necessary parts to make complete unit.

4—Sterling 250-H.P. Boilers, Class F No. 5, 192—3¾-in. tubes, 42-in. steam and mud drums. Pressure 160 lb., 8-in. steam opening.

STEEL BRIDGE

Also 1 single track steel bridge through span 129 ft. 9 in. Trusses, nine-panel, pin connected, Pratt type, 21 ft. high, 15 ft. 10 in. centers. Loading 60-ton electric cars in train. Can be easily modified for highway use.

For information and prices address

G. W. WAGNER
Detroit United Railway Company
DETROIT, MICH.

WANTED

16 General Electric No. 58 Motors

with 4 turn armatures

TRANSIT EQUIPMENT CO.
501-5th Avenue, New York City

Second Hand or Used Trucks Wanted

Wanted, two Brill 21-E Trucks with 33-in. wheels, 4-in. axles, either 7-ft. 6-in. or 8-ft. wheelbase; wheels must have at least 2¼-in. face or else sold without wheels. State price.

Selma Electric Railway Co.
Selma, Ala.

WANTED—5,000 Second Hand

TIE-PLATES

for 70-lb. ASCE Tee Rail.

Rochester & Syracuse Railroad Co., Inc.
J. H. HICKEY, *Purchasing Agent*
500 Syracuse Savings Bank Bldg., Syracuse, N. Y.

WANTED

FLAT CAR

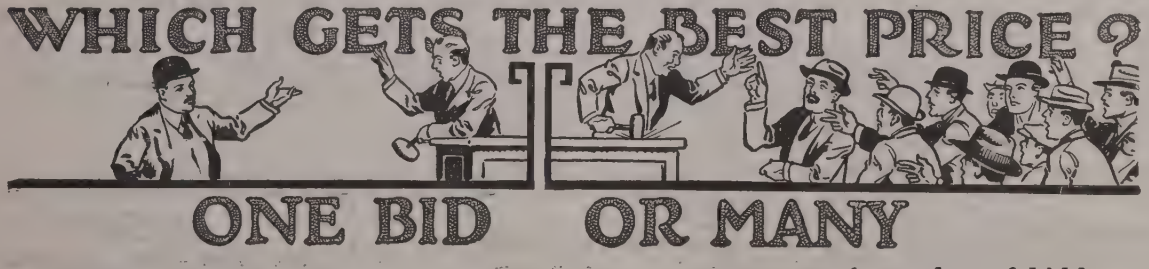
equipped with M C B Radial Draw Bar and Air.

W541 Electric Railway Journal
1570 Old Colony Bldg., Chicago, Ill.

ROTARY

1—300 Kw. Rotary Converter, 600-v. D.C. 3-phase, 60-cycle A.C. with 3—125 Kw. 2300-v. Primary Transformers.

WILSON
1102 Federal Reserve Bank Bldg.,
St. Louis, Mo.



One bidder usually buys at a sale price.

A number of bidders enables the seller to get full market value.

When you have Second Hand Equipment to sell you want *all the bidders possible.*

Advertising secures more bidders.

An advertisement in *one* issue may make a sale possible but—to sell at the *best* price you must have a choice among a *number* of buyers.

A *number* of insertions will get them for you.

***BE SURE**—advertise your equipment until it is sold. Advertise it in the SEARCHLIGHT SECTION to get the **most** bidders.*

0010

TURBINE

1—500-kw. Westg. Horizontal, 3-ph., 60-cy., 370-v. (can be rewound for any standard voltage), 3600 r.p.m., with or without condensing equipment.

FREQUENCY CHANGER

1—600-kw. Allis-Chal. 300 r.p.m., 3-ph., 60-cy., 2300-v. and 3-ph., 25-cy., 6600-v., complete with direct connected exciter, panelboards and rheostats.

ROTARY CONVERTERS

1—500-kw. Westinghouse Rotary Converter, 6-ph., 600-v. D.C., 430-v. A.C., 600 r.p.m.
1—300-kw. Westinghouse Rotary Converter, 3-ph., 60-cy., 370-v. A.C., 575-v. D.C., 600 r.p.m.
1—150-kw. Westinghouse Rotary Converter, 2 or 3-ph., 60-cy., 250-v. D.C., 720 r.p.m.

ARCHER & BALDWIN, INC.
114-118 Liberty St., New York, N. Y.
Telephone 4337-4338 Rector

SEARCHLIGHT SERVICE SECURES SATISFACTORY SITUATIONS SALES

NEW RAILS

500 tons 100-lb.
200 tons 90-lb.
650 tons 80-lb.
150 tons 75-lb.
450 tons 70-lb.
800 tons 60-lb.

SWITCH TURNOUTS

3—70-lb. A.S.C.E., and frog Manganese. New.
1—60-lb. ARA-A 4½ L. H. Good as new.
800 kegs ⅞ x 5½ in. New Spikes.
400—70-lb. Rail Braces. New.

Track Accessories, All Kinds Prompt Shipment.

ZELNICKER IN ST. LOUIS

Get Bulletin No. 270—60 pages of unusual values. It's a Big Money Saver.

Plant Equipment For Sale

1—300-hp. Russell Four-Valve Automatic Engine.

1—200-kw. Stanley, 2300-volt, 2 or 3-phase, A. C. Generator with complete Switchboard. Necessary fittings.

All above in good condition. For Price write,

COUCH BROS. MANUFACTURING COMPANY, Atlanta, Ga.

FOR SALE

2—Walker Generators, 550 volt.
2—General Electric Generators, 550 volt, total approximating 5000 kilowatts.
All direct connected to Allis-Chalmers engines.
6—B. & W. 250-hp. boilers and
6—Altman Taylor 500-hp. boilers.

Also Switchboard and other necessary equipment. The above machinery in operation at present time.

KANSAS CITY RAILWAYS CO.
Purchasing Dept., Kansas City, Mo.

HYMAN MICHAELS COMPANY

Peoples Gas Building, CHICAGO, ILL.

NEW *and* RELAYING RAILS
IRON *and* STEEL SCRAP

Plants at East Chicago, Indiana
St. Louis Plants, Adelaide and Bulwer Ave., and Broadway and Humboldt St.
St. Louis Office, Railway Exchange Building
Pittsburgh Office, First National Bank Building

25-cy. 3-ph. Eng. Sets.
1—1000-kva. 370-v. G. E.
2—750 kva., 370 v.
1—3000 kva. Plant.
Complete with boilers, stokers, etc.
April, 1920, delivery.
2—500-kw. Ry. Rotaries.
2—500-kw., 60-cy. Ry. M.D. Sets.
30—Boilers, 100-525 hp.
1—300-kw. portable Ry. substation.
5—300 Railway rotaries and Auxls.

ROSS POWER EQUIP. CO.
Indianapolis, Ind.

3—Brill Semi-Convertible Cars

28- ft. over corner posts.
Brill 27-F trucks.
4—G. E. 67 motors, 2-K-6 Controllers.
Splendid condition. Full details upon request.

Electric Equipment Company
Commonwealth Building,
Philadelphia, Pa.

RAILS

15,000 TONS—NEW and RELAYERS
NEW—12 lb., 16 lb., 20 lb., 25 lb., 30 lb., 40 lb., 60 lb., 70 lb., 75 lb., 80 lb., 85 lb., 90 lb.
RELAYERS—30 lb., 35 lb., 40 lb., 45 lb., 56 lb., 60 lb., 70 lb., 80 lb., 85 lb., 90 lb., 100 lb.

Fastenings, New Bolts, Nuts and Spikes, New Frogs, Switches, Crossings and all accessories. Carload and less carload inquiries and orders a specialty. Rails cut to lengths for structural purposes. Attractive prices. Immediate shipments from stock.

L. B. FOSTER COMPANY
General Office:
Park Building, Pittsburgh, Pa.

Tribune Bldg., 154 Nassau St., New York N. Y.

CARS FOR SALE

2—McKean Gaso-Electric Cars.
12—Differential 20-yd. Cars.
5—Gasoline Passenger Cars.
50—Freight Cars.
12—Electric Sets.
Get our List and Prices.

J. F. DONAHOO CO., Birmingham, Ala.

WORRYLESS ELECTRICAL REPAIRS

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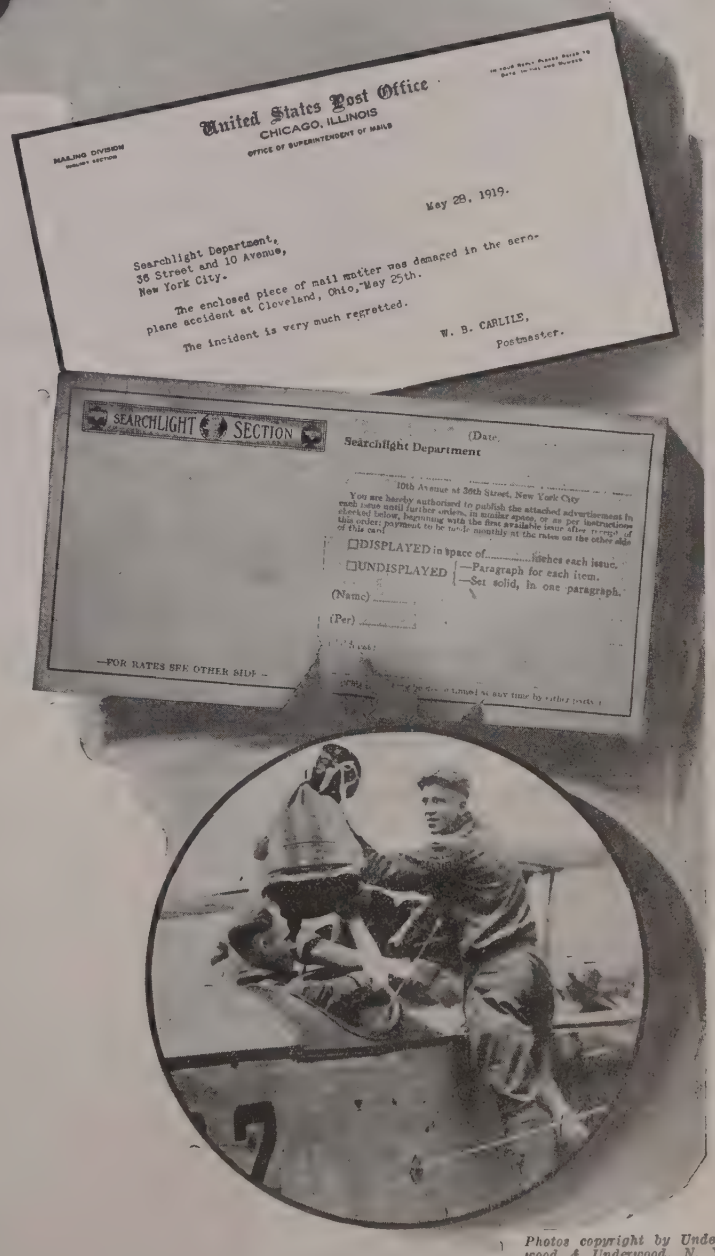
United States Post Office
CHICAGO, ILLINOIS
OFFICE OF SUPERINTENDENT OF MAILS
MAILING DIVISION
May 28, 1919.
Searchlight Department,
36 Street and 10 Avenue,
New York City.
The enclosed piece of mail matter was damaged in the aero-
plane accident at Cleveland, Ohio, May 25th.
The incident is very much regretted.
W. B. CARLILE,
Postmaster.
SEARCHLIGHT SECTION
(Date)
Searchlight Department
10th Avenue at 36th Street, New York City
You are hereby authorized to publish the attached advertisement in
each issue until further orders, in number spaces, or as per instructions
checked below, beginning with the first available issue after receipt of
this order; payment to be made monthly at the rates on the other side
of this card.
DISPLAYED in space of inches each issue.
UNDISPLAYED —Paragraph for each item.
—Set solid, in one paragraph.
(Name)
(Per)
—FOR RATES SEE OTHER SIDE —

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WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Advertising, Street Car
Collier, Inc., Barron G.

Air Rectifiers
Holden & White, Inc.

Ammeters
Weston Elec'l Instrument Co.

Anchors, Guy
Chance Co., The
Electric Service Supplies Co.
Holden & White, Inc.
Johns-Manville Co., H. W.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Ash Storage Tanks, Cast Iron
Green Engineering Company

Automobiles and Buses
Brill Co., The J. G.

Axle Straighteners
Columbia M. W. & M. I. Co.

Axles, Car Wheel
Bemis Car Truck Co.
Brill Co., The J. G.
Cambria Steel Co.
Carnegie Steel Co.
Midvale Steel & Ordnance Co.
National Railway Appliance Co.
St. Louis Car Co.
Standard Steel Works Co.
Westinghouse Elec. & M. Co.

Babbitt Metal
Ajax Metal Co.
More-Jones Brass & Metal Co.

Babbitting Devices
Columbia M. W. & M. I. Co.

Badges and Buttons
Electric Service Supplies Co.
International Register Co., The

Batteries, Dry
Johns-Manville Co., H. W.

Batteries, Storage
Electric Storage Battery Co.
Johns-Manville Co., H. W.

Bearings and Bearing Metals
Ajax Metal Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
More-Jones Brass & Metal Co.
St. Louis Car Co.
Westinghouse Elec. & M. Co.

Bearings, Center and Roller Side
Holden & White, Inc.

Bells and Gongs
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
St. Louis Car Co.

Benders, Rail
Niles-Bement-Pond Co.
Zelnicker, Walter A., Supply Co., Inc.

Boilers
Babcock & Wilcox Co.

Boiler Coverings
Johns-Mansville Co., H. W.

Boiler Tubes
National Tube Co.

Bond Testers
American Steel & Wire Co.

Bonding Apparatus
American Steel & Wire Co.
Electric Railway Improvement Co.
Electric Service Supplies Co.
Ohio Brass Co.

Bonds, Rail
American Steel & Wire Co.
Electric Railway Improvement Co.
Electric Service Supplies Co.
General Electric Co.
Johns-Manville Co., H. W.
Ohio Brass Co.
Westinghouse Elec. & M. Co.

Boring Tools, Car Wheel
Niles-Bement-Pond Co.

Brackets and Cross Arms. (See also Poles, Ties, Posts, Etc.)
American Bridge Co.
Bates Expanded Steel Truss Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
Hubbard & Co.
Lindsley Bros. Co.
Ohio Brass Co.

Brake Adjusters
Holden & White, Inc.
Westinghouse Traction Brake Co.

Brake Shoes
Amer. Brake Shoe & Fdry. Co.
Barbour-Stockwell Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

Brakes, Brake Systems and Brake Parts
Allis-Chalmers Mfg. Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Columbia M. W. & M. I. Co.
General Electric Co.
Holden & White, Inc.
National Brake Co.
St. Louis Car Co.
Safety Car Devices Co.
Westinghouse Traction Brake Co.

Bricks, Fire
Green Engineering Co.

Bridges & Buildings
American Bridge Co.
Thompson-Starrett Co.

Brooms, Track, Steel or Rattan
Paxson Co., J. W.
Zelnicker, Walter A., Supply Co., Inc.

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
Morgan Crucible Co.
United States Graphite Co.
Westinghouse Elec. & M. Co.

Brushes, Graphite
United States Graphite Co.

Brush Holders
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.

Buckets
Blaw-Knox Company

Bunkers, Coal
American Bridge Co.

Bushings
Ives Co., The H. B.

Bushings, Case Hardened & Manganese
Bemis Car Truck Co.

Bushings, Graphite & Wooden
Bound Brook Oilless Bearing Co.

Cables. (See Wires and Cables)

Carbon Brushes. (See Brushes, Carbon)

Car Equipment. (For Fenders, Heaters, Registers, Wheels, etc. See those headings)

Car Trimmings. (For Curtains, Registers, Doors, Seats, etc. See those headings)

Car Panel Safety Switches
Westinghouse Elec. & Mfg. Co.

Cars, Passenger, Freight, Express, etc.
American Car Co.
Brill Co., The J. G.
Cambria Steel Co.
Kuhlman Car Co., G. C.
Midvale Steel & Ordnance Co.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.
Thomas, Perley A.
Wason Mfg. Co.

Cars, Second Hand
Electric Equipment Co.

Car, Self-Propelled
Electric Storage Battery Co.
General Electric Co.

Castings, Brass, Composition or Copper
Ajax Metal Co.
Anderson Mfg. Co., A. & J. M.
Columbia M. W. & M. I. Co.
Eureka Co.
More-Jones Brass & Metal Co.

Castings, Gray Iron and Steel
American Bridge Co.
American Steel Foundries
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
St. Louis Car Co.
Standard Steel Works Co.

Castings, Malleable and Brass
Amer. Brake Shoe & Fdry. Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
St. Louis Car Co.

Catchers and Retrievers, Trolley
Electric Service Supplies Co.
Holden & White, Inc.
Ohio Brass Co.
Wood Co., Chas. N.

Change Carriers
McGill Ticket Punch Co.

Circuit Breakers
Cutter Electrical & Mfg. Co., The
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Clamps and Connectors for Wires and Cables
Anderson Mfg. Co., A. & J. M.
Electric Railway Equipment Co.
Electric Service Supplies Co.
Eureka Co.
General Electric Co.
Hubbard & Co.
Klein & Sons, Matthias
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

Cleaners and Scrapers Track—(See also Snow-Plows, Sweepers and Brooms)
Brill Co., The J. G.
Ohio Brass Co.

Clusters and Sockets
General Electric Co.

Coal and Ash Handling—(See Conveying and Hoisting Machinery)

Coil Banding and Winding Machines
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

Coils, Armature and Field
Cleveland Armature Works.
Columbia M. W. & M. I. Co.
D. & W. Fuse Co.
General Electric Co.
Independent Lamp & Wire Co.
Rome Wire Co.
Westinghouse Elec. & M. Co.

Coils, Choke and Kicking
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & M. Co.

Coin-Counting Machines
Electric Service Supplies Co.
International Register Co., The
Johnson Fare Box Co.

Commutator Slotters
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Commutator Truing Devices
General Electric Co.

Commutators or Parts
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Cleveland Armature Works.
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Compressors, Air
Allis-Chalmers Mfg. Co.
Chicago Pneumatic Tool Co.
General Electric Co.
Westinghouse Trac. B. Co.

Concrete Mixers
Blaw-Knox Co.

Condensers
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Connectors, Solderless
Westinghouse Elec. & Mfg. Co.

Contracting Engineers
Thompson Starrett Co.

Controller Fingers
Eureka Co.
Triggerlock Reversible Controller Finger

Controllers or Parts
Allis-Chalmers Mfg. Co.
Columbia M. W. & M. I. Co.
Eureka Co.
General Electric Co.
Johns-Manville Co., H. W.
Triggerlock Reversible Controller Finger.
Westinghouse Elec. & Mfg. Co.

Controller Regulators
Elec. Service Supplies Co.

Controlling Systems
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Converters, Rotary
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Conveyors, Belt
Portable Machinery Co.

Conveyors, Coal & Ash
Green Eng. Co.
Portable Machinery Co.

Conveyors, Portable
Portable Machinery Co.

Conveying and Hoisting Machinery
American Bridge Co.
Columbia M. W. & M. I. Co.
Green Engrg. Co.
Portable Machinery Co.

Cord, Bell, Trolley, Register, etc.
Brill Co., The J. G.
Electric Service Supplies Co.
International Register Co., The
Roeblings Sons Co., John A.
Samson Cordage Works

Cord Connectors and Couplers
Electric Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

Couplers, Car
Brill Co., The J. G.
Ohio Brass Co.
Van Dorn Coupler Co.
Westinghouse Trac. B. Co.

Cranes
Allis-Chalmers Mfg. Co.
Niles-Bement-Pond Co.
Toledo Bridge & Crane Co., The

Creosoting. (See Wood Preservatives)

Cross Arms. (See Brackets)

Crossing Foundations
International Steel Tie Co.

Crossing Signals. (See Signals, Crossing)

Crossings, Track. (See Track, Special Work)

Crushers, Rock
Allis-Chalmers Mfg. Co.

Culverts
Armco Iron Culvert & Flume Mfrs. Assn.
Canton Culvert & Silo Co.

Curtains and Curtain Fixtures
Brill Co., The J. G.
Electric Service Supplies Co.
St. Louis Car Co.

Dealers' Machinery
Archer & Baldwin
Cleveland Armature Wks.
Electric Equipment Co.
Foster Co., L. B.
Griswold Machine Co., Geo. M.
Hyman Michaels Co.
MacGovern & Co., Inc.
Zelnicker Supply Co., Inc., Walter A.

Derailing Devices. (See also Track Work)
Cleveland Frog & Crossing Co.

Destination Signs
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.

Detective Service
Wish Service, P. Edward

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One of the Portable Electrodynamometer Group, which also includes Model 310 Single Phase and D.C. Wattmeter, Model 329 Polyphase Wattmeter, and Model 370 A.C. and D.C. Ammeter.

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Selling Agents for Tool Steel Gears and Pinions, Anderson Slack Adjusters, Genesco Paint Oils, Clapp Fire Resisting Paint, Dunham Hopper Door Device, Feasible Drop Brake Staff, Anglo-American Varnish Paints, Enamels, Surfacer and Shop Cleaner, Johnson Fare Boxes, Perry Side Bearings, Miller Trolley Shoes, Hartman Centering Center Plates, One Man Kerosene Furnaces, Economy Power Saving Meters, Jewel Street Car Heaters, H. & W. Electric Heaters, Garland Ventilators, National Safety Car Equipment Company's One Man Cars, Pitt Sanders.

WHAT AND WHERE TO BUY

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Williams & Co., J. H.

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National Pneumatic Co., Inc.
Safety Car Devices Co.

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Johns-Manville Co., H. W.

Doors and Door Fixtures
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General Electric Co.
Hale & Kilburn Corp.

Doors, Folding Vestibule
National Pneumatic Co., Inc.

Draft Rigging. (See Couplers)

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American Steel & Wire Co.
Chicago Pneumatic Tool Co.
Electric Service Supplies Co.
Niles-Bement-Pond Co.
Ohio Brass Co.

Dryers, Sand
Electric Service Supplies Co.
Zelnicker Supply Co., Walter A., Inc.

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Roebling's Sons Co., J. A.

Engineers, Consulting, Contracting and Operating
Archbold-Brady Co.
Arnold Co., The
Clark Management Corp., E. W.
Drum & Co., A. L.
Feustel, Robert M.
Ford, Bacon & Davis
Holst, Englehardt W.
Republic Engineers, Inc.
Richey, Albert S.
Robinson & Co., Dwight P.
Scofield Engineering Co.
Stone & Webster
Wells, Gardiner F.
White Companies, The J. G.
Woodmansee & Davidson Engineering Co.

Engines, Gas and Oil
Allis-Chalmers Mfg. Co.
Westinghouse Elec. & Mfg. Co.

Engines, Steam
Allis-Chalmers Mfg. Co.
Westinghouse Elec. & Mfg. Co.

Fabricated Steel
Blaw-Knox Co.

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Cleveland Fare Box Co.
National Railway Appliance Co.

Fences, Woven Wire and Fence Posts
American Steel & Wire Co.

Fenders and Wheel Guards
Brill Co., The J. G.
Cleveland Fare Box Co.
Consolidated Car Fender Co.
Electric Service Supplies Co.
Star Brass Works.

Fibre and Fibre Tubing
Westinghouse Elec. & Mfg. Co.

Field Coils. (See Coils)

Filters, Water
Scaife & Sons Co., Wm. B.

Fire Extinguishing Apparatus
Castle Inc., James M.
Johns-Manville Co., H. W.

Floodlights
Electric Service Supplies Co.

Flooring Composition
American Mason Safety Thread Co.

Flooring, Grating
Irving Iron Wks.

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Carnegie Steel Co.
Columbia Machine Wks. & M. I. Co.
Eureka Co.
Standard Forgings Co.
Standard Steel Works Co.
Williams & Co., J. H.

Frogs, Track. (See Track Work)

Furnaces. (See Stokers)

Fuses and Fuse Boxes
Chicago Fuse Mfg. Co.
Columbia M. W. & M. I. Co.
D. & W. Fuse Co.
General Electric Co.
Johns-Manville Co.
Westinghouse Elec. & Mfg. Co.
Williams & Co., J. W.

Fuses, Refillable
Columbia M. W. & M. I. Co.
General Electric Co.

Gages, Oil and Water
Ohio Brass Co.

Gaskets
Power Specialty Co.
Johns-Manville Co., H. W.
Westinghouse Traction Brake Co.

Gas-Electric Cars
General Electric Co.

Gas Producers
Westinghouse Elec. & Mfg. Co.

Gates, Car
Brill Co., The J. G.

Gear Blanks
Carnegie Steel Co.
Standard Steel Works Co.

Gear Cases
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
Westinghouse Elec. & Mfg. Co.

Gears and Pinions
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Electric Service Supplies Co.
General Electric Co.
National Railway Appliance Co.
Nuttall Co., R. D.

Generating Sets, Gas-Electric
General Electric Co.

Generators
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Gongs. (See Bells and Gongs)

Graphite
Morgan Crucible Co.

Grates, Chain
Green Eng. Co.

Greases. (See Lubricants)

Grinders and Grinding Supplies
Metal & Thermit Corp.
Railway Track-work Co.

Grinding Blocks and Wheels
Railway Track-work Co.

Guards, Cattle
American Bridge Co.

Guards, Trolley
Electric Service Supplies Co.
Ohio Brass Co.

Harps, Trolley
Anderson M. Co., A. & J. M.
Bayonet Trolley Harp Co.
Electric Service Supplies Co.
Hensley Trolley & Mfg. Co.
More-Jones B. & M. Co.
Nuttall Co., R. D.
Star Brass Works

Headlights
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
St. Louis Car Co.

Heaters, Car (Electric)
Consolidated Car Heating Co.
Gold Car Heating & Lighting Co.
Holden & White, Inc.
Smith Heater Co., Peter.

Heaters, Car, Hot Air and Water
Cooper Heater Co.
Holden & White, Inc.
Smith Heater Co., Peter

Heaters, Car (Stove)
Electric Service Supplies Co.
Holden & White, Inc.
Smith Heater Co., Peter

Hoists and Lifts
Columbia M. W. & M. I. Co.
Ford-Chain Block Co.
Niles-Bement-Pond Co.
Toledo Bridge & Crane Co., The

Hose, Bridges
Ohio Brass Co.

Hose, Pneumatic and Fire
Johns-Manville Co., H. W.

Hydraulic Machinery
Allis-Chalmers Mfg. Co.
Niles-Bement-Pond Co.

Industrial Construction
Thompson-Starrett Co.

Inspection
Electrical Testing Lab's

Instruments, Measuring, Testing and Recording
Economy Electric Devices Co.
General Electric Co.
Johns-Manville Co., H. W.
Westinghouse Elec. & Mfg. Co.
Weston Elec'l Instrument Co.

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General Electric Co.
Johns-Manville Co., H. W.
U. S. Rubber Co.
Westinghouse Elec. & Mfg. Co.

Insulating Machinery
American Insulating Machinery Co.

Insulation. (See also Paints)
Anderson M. Co., A. & J. M.
Drew Electric & Mfg. Co.
Electric Ry. Equipment Co.
Electric Service Supplies Co.
eneral Electric Co.
Holden & White, Inc.
Johns-Manville Co., H. W.
Mitchell-Rand Mfg. Co.
U. S. Rubber Co.
Westinghouse Elec. & Mfg. Co.

Insulators. (See also Line Material)
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Drew Electric & Mfg. Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

Insulator Pins
Electric Service Supplies Co.
Hubbard & Co.

Jacks. (See also Cranes, Hoists and Lifts)
Brill Co., The J. G.
Buckeye Jack Mfg. Co.
Columbia M. W. & M. I. Co.
National Ry. Appliance Co.
Templeton, Kenly Co., Ltd.

Joints, Rail
Carnegie Steel Co.
Lackawanna Steel Co.
Zelnicker Supply Company, Inc., Walter A.

Journal Boxes
Bemis Car Truck Co.
Brill Co., J. G.

Junction Boxes
Johns-Manville Co., H. W.

Laboratories
Electric Testing Lab's

Lamp Guards and Fixtures
AndersonM. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Lamps, Arc and Incandescent. (See also Headlights)
Anderson M. Co., A. & J. M.
General Electric Co.
Westinghouse Elec. & Mfg. Co.

Lamps, Signal and Marker
Ohio Brass Co.

Lathe Attachments
Williams & Co., J. H.

Lathes, Car Wheel
Niles-Bement-Pond Co.

Lighting Regulators, Car
Holden & White, Inc.

Lightning Protection
Anderson M. Co., A. & J. M.
Electric Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

Line Material. See also Brackets, Insulators, Wires, etc.)
Anderson M. Co., A. & J. M.
Archbold Brady Co.
Chance Co., The
Columbia M. W. & M. I. Co.
Drew Electric & Mfg. Co.
Electric Railway Equipment Co.
Electric Service Supplies Co.
Eureka Co.
General Electric Co.
Holden & White, Inc.
Hubbard & Co.
Johns-Manville Co., H. W.
More-Jones B. & M. Co.
Ohio Brass Co.
Westinghouse Elec. & Mfg. Co.

Loaders, Wagon, Truck or Car
Portable Machinery Co.

Locomotives, Electric
Brill Co., The J. G.
General Electric Co.
McGuire Cummings Mfg. Co.
Westinghouse Elec. & Mfg. Co.

Lubricating Engineers
Galena-Signal Oil Co.

Lumber. (See Poles, Ties, etc.)

Lubricants, Oil and Grease
Galena-Signal Oil Co.

Machine Tools
Columbia M. W. & M. I. Co.
Fairbanks Co., The
Niles-Bement-Pond Co.

Machine Work
Columbia M. W. & M. I. Co.
Holden & White, Inc.

Meters, Car, Watt-Hour
Economy Electric Devices Co.

Meters. (See Instruments)
Electric Service Supplies Co.

Mirrors for Motormen
Drew Elec. & Mfg. Co.

Motormen's Seats
Electric Service Supplies Co.
Wood Co., Chas. N.

Motors, Electric
Allis-Chalmers Mfg. Co.
Westinghouse Elec. & Mfg. Co.

Motors and Generators, Sets
General Electric Co.

Nuts and Bolts
Allis-Chalmers Mfg. Co.
Barbour-Stockwell Co.
Bemis Car Truck Co.
Columbia M. W. & M. I. Co.
Hubbard & Co.
Lackawanna Steel Co.

Ohmmeters
Weston Elec'l Instrument Co.

Oils. (See Lubricants)

Oxy-Acetylene. (See Cutting Apparatus, Oxy-Acetylene)

Packing
Power Specialty Co.
U. S. Rubber Co.
Westinghouse Traction Brake Co.

Packing, Journal Box
Franklin Mfg. Co.

Paints and Varnishes (Insulating)
Holden & White, Inc.
Mitchell-Rand Mfg. Co.

Paints and Varnishes (Preservative)
Johns-Manville Co., H. W.

Paints and Varnishes for Woodwork
National Ry. Appliance Co.

Paving Material
American Brake Shoe & Fdry. Co.
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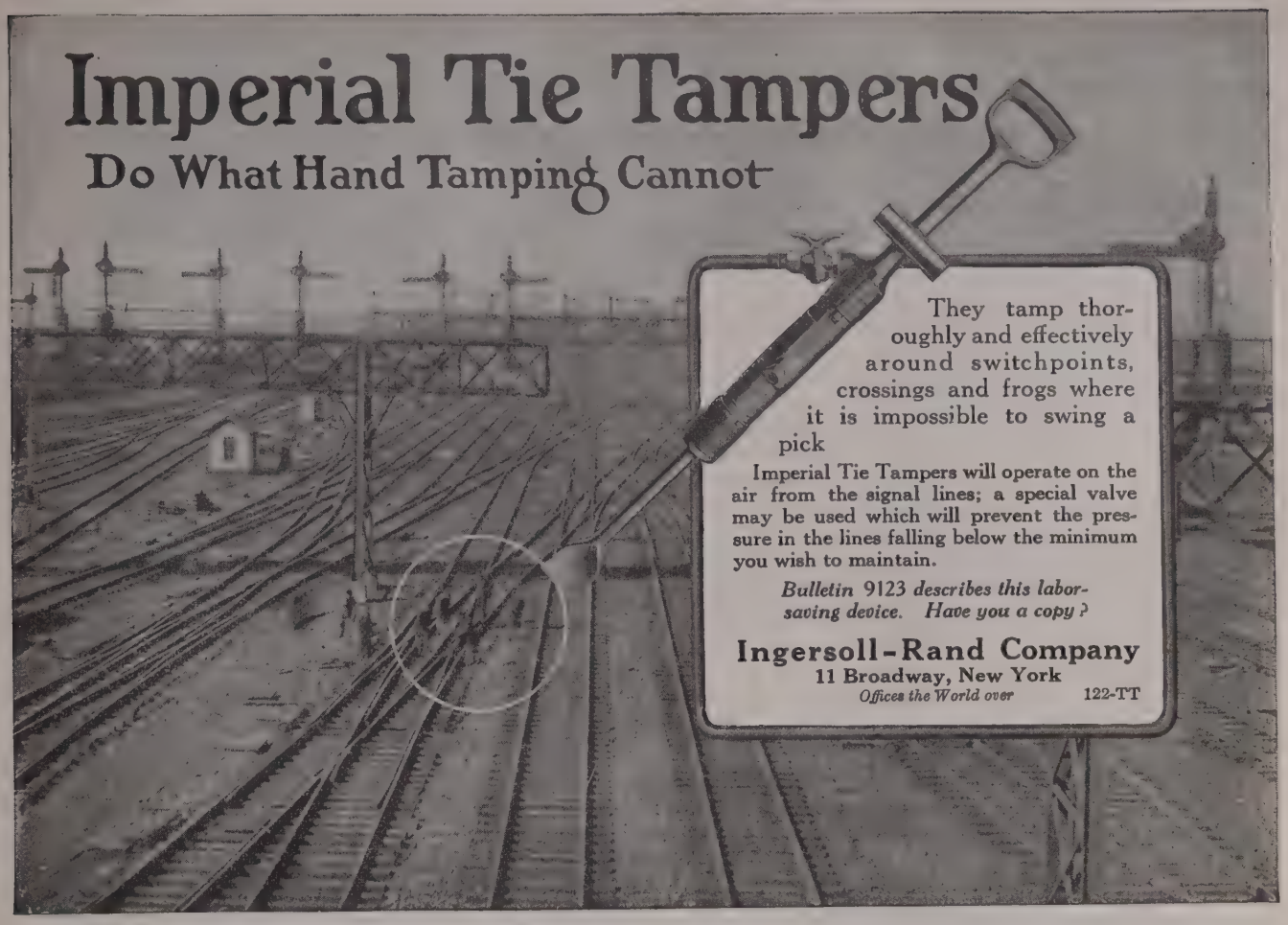
Do What Hand Tamping Cannot



They tamp thoroughly and effectively around switchpoints, crossings and frogs where it is impossible to swing a pick

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Creosoted Poles for Permanency—

The *"permanency"* demanded of wood poles is assured by proper creosoting treatment. Proper treatment means the Open Tank process—hot and cold treatment—and insures thorough impregnation of the sapwood. Best results are assured by following the recommendations suggested herewith, and using Carbosota Creosote Oil.

Recommendations for Butt Treatment of Cedar and Chestnut Poles by the Open Tank Process

CONDITION OF POLES. Poles should be seasoned until air-dry, and otherwise conform to standard specifications.

PREPARATION OF POLES. Of the surface to be creosoted, the area between a point one to two feet above, and a point 2 to 3 feet below the future ground line should be carefully cleaned of all adhering inner bark, or other foreign substance. Parts of the exterior surface showing soft or brashy wood should be shaved clean, until sound wood is exposed.

Barrett B Carbosota Grade-One Liquid Creosote Oil

TREATMENT. Pole-butts should be completely immersed in the preservative to a point two feet above the future ground line.

HOT TREATMENT. When treating tank has been charged, creosote oil should be admitted at a temperature of about 150 degrees F. and thereafter maintained at between 200 degrees F. and 220 degrees F. for the required period.

COLD TREATMENT. At the end of the "hot period" the cold creosote oil should be admitted until the temperature of the creosote drops a hundred degrees, whereupon the creosote oil and poles should be permitted to further cool to atmospheric temperature for the required period.

The level of oil in treating tank should be maintained uniform. Portion of pole being creosoted should not be exposed to atmosphere during treatment.

IMPREGNATION. The object of the treatment is to obtain complete impregnation of the sapwood. It should be required that the average visible penetration of the creosote oil should not be less than 50% of the depth of the sapwood ring.

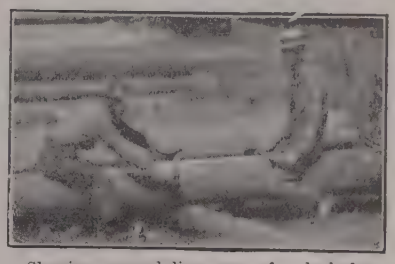
Inspection should be by borings made with a Swedish increment borer, or similar instruments which recover an intact core of wood.

PRESERVATIVE. The preservative to be used should be a pure refined coal-tar creosote oil, meeting standard specifications. ("Carbosota Creosote Oil" is an identification mark—guaranteeing uniformity and efficiency.)

Green, or frozen poles should not be treated under these specifications.

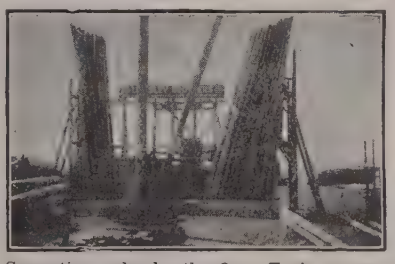
TOPS, GAINS, ETC. Tops, gains and abrasions should be given a two-coat brush application of refined coal-tar creosote oil, heated to about 150 degrees F. (Note.—Small plants can give treatment in accordance with these recommendations by maintaining the required period of hot treatment, and thereafter permitting both oil and poles to cool to atmospheric temperatures.)

Technical service, detailed recommendations, etc., for application of wood preservation obtainable gratis by addressing nearest office.

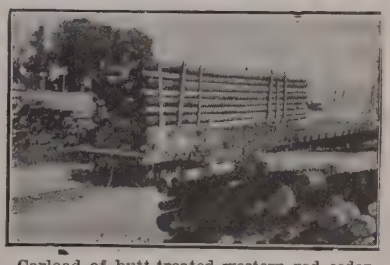


Shaving ground line area of pole before treatment.

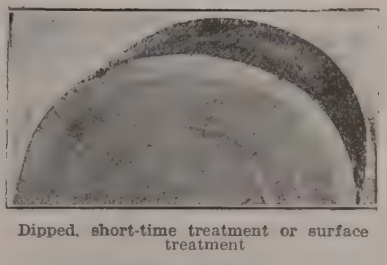
"Snaking" shaved pole to creosoting tanks



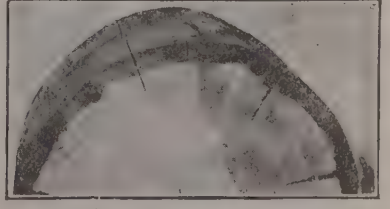
Creosoting poles by the Open Tank process



Carload of butt-treated western red cedar poles leaving creosoting plant



Dipped, short-time treatment or surface treatment



Open Tank process (hot and cold treatments) Note thorough impregnation of sapwood

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"The New Haven"

Trolley Wheel Bushing

Perfect Lubrication

No Oil Required

Made from special bearing metal, machine rifled, eliminating all sand, scale or grit. Grooves, running entire length, are filled under heavy pressure with a hard lubricating compound, making a smooth-running, perfectly lubricated bearing without the use of oil. Catalogue mailed upon application.

The H. B. Ives Company, New Haven, Conn., U. S. A.

MASON SAFETY TREAD—Lead or carborundum filled; non-slippery; prevents accidents; cuts out damage suits.

KARBOLITH CAR FLOORING—For steel cars; is sanitary, light weight, fire proof, non-slippery.

STANWOOD STEPS—Self-cleaning, non-slippery, light.

Our products used on all leading railroads, on cars and stations. For details address:

American Mason Safety Tread Co.,

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Branch Offices: Boston, New York City, Philadelphia.
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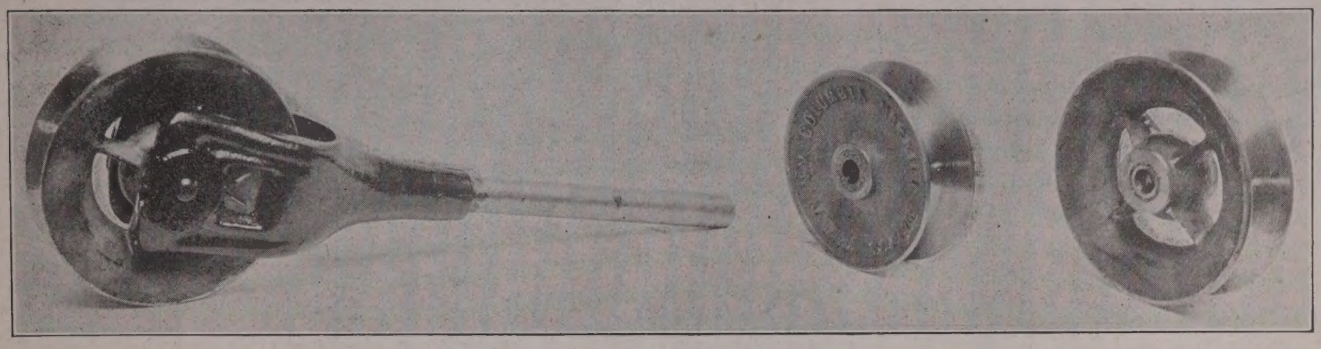

Quality Trolley Wheels and Harps

Like all other Columbia products the trolley wheels and trolley harps manufactured by us have as their motto Quality.

Quality first, last and always. This means to our customers that they can be assured the best the market can afford.

Our wheels and harps are made of the very best metals that can be obtained. Special attention has been given to get long wear and good lubrication. This means the elimination of high maintenance and numerous tie ups due to defective trolley harps and wheels.

Let us hear from you. We want to help you.

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TOOLS

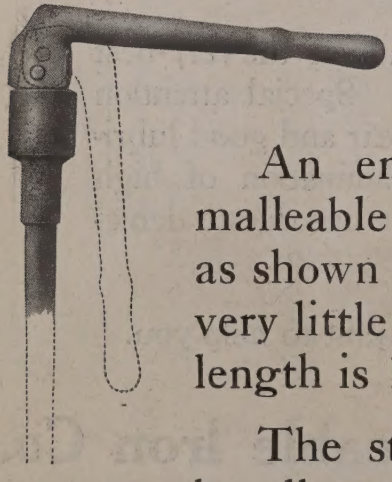
Armature and axle straighteners
Armature shaft straighteners
Armature buggies and stands
Babbitting molds
Banding and heading machines
Car hoists
Car replacers
Coil taping machines for armature leads
Coil winding machines
Pinion pullers
Pit jacks
Signal or target switches
Tension stands

CAR EQUIPMENT

Armature and axle bearings
Armature and field coils
Bearings (axle and armature)
Brush-holders and brush-holder springs
Brake, door and other handles
Brake forgings, riggings, etc.
Car trimmings
Commutators
Controller handles
Forgings of all kinds
Gear cases (steel or malleable iron)
Grid resistors
Third-rail shoe beams and accessories
Trolley poles (steel) and wheels

Standard on Birney Safety Cars

Brill Standard Drop Brake Handle



An emergency ratchet brake handle of malleable iron, which when not in use drops as shown in the illustration and thus occupies very little valuable platform space. Its overall length is 16 in.

The steel stub furnished with this brake handle can be welded to staff of any standard type brake.

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THE J. G. BRILL COMPANY

Philadelphia, Pa.

AMERICAN CAR CO., St. Louis, Mo.
G. C. KUHLMAN CAR CO., Cleveland, Ohio.
WASON MANFG. CO., Springfield, Mass.

BIRNEY TRADE MARK SAFETY CAR

Operating the average city type cars requires exorbitant power expense.

You are Paying for Birney Safety Cars Anyway

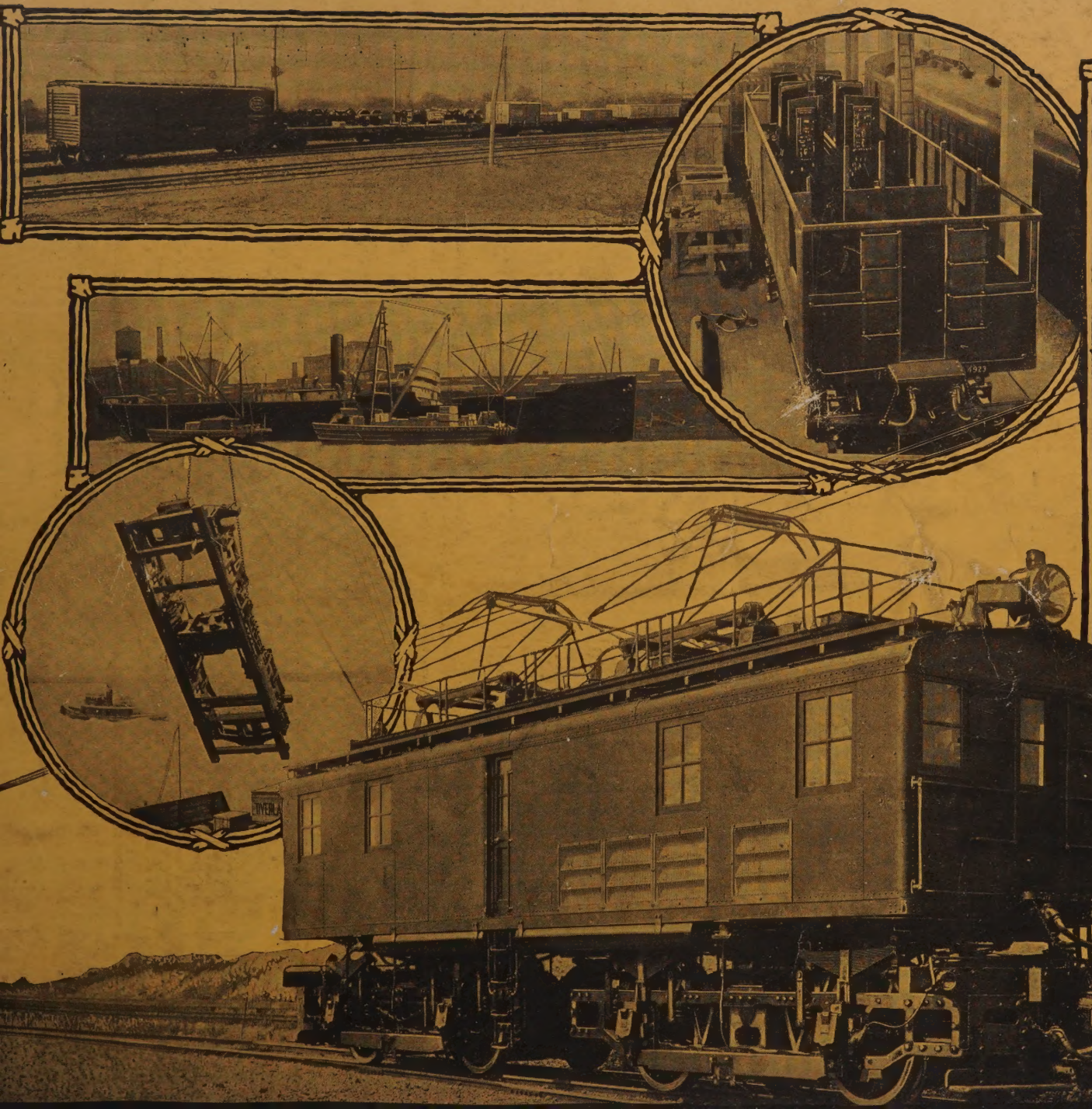
Railways operating the usually heavy city type car unnecessarily are turning a considerable portion of their earnings into the production of power necessary to operate. This money is gone—there is no return. An investment in Birney Safety Cars will show a return in the form of reduced power consumption and increased earnings. Birney Safety Cars have passed the experimental stage. They have firmly established themselves as the most economical and profitable form of street railway equipment.

Birney Safety Cars will save considerable in power expense and at the same time increase revenue.

THE J. G. BRILL COMPANY

Philadelphia, Pa.

AMERICAN CAR CO., St. Louis, Mo.
G. C. KUHLMAN CAR CO., Cleveland, Ohio.
WASON MANFG. CO., Springfield, Mass.



Globe Travelers

G-E electric locomotives have been built and shipped to practically every section of the world. Back and forth across the Rockies; in Japan collieries; and on the lines from the mines to the sea in Chile.

Electric Locomotives made and equipped by this company are doing well the work demanded of them.

One of the locomotives for Chile is shown on this page in the various stages of disassembly, transportation by rail and shipment by water.

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